THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Heavy buying of pig iron in the West has established that market on a much firmer basis, and the lead of the big malleable and implement interests in covering requirements for the remainder of the year will be followed by buying on the part of smaller interests. Chicago reports sales of about 150,000 tons of iron in the past ten days, the leading malleable interests buying 50,000 tons of malleable Bessemer at $17.50, while the leading harvester interest has purchased close on to 50,000 tons of foundry iron, Northern furnaces securing over 25,000 tons at $17, while more than 20,000 tons was placed with non-association Southern furnaces on the basis of $12, Birmingham. Numerous other purchases of both malleable and foundry in lots ranging from 3,000 to 5,000 tons were made. This heavy buying of Southern foundry iron has practically established the market on a $12 basis, and much interest is manifested in the action to be taken at the meeting of the Southern furnace association to be held within a few days. The buying of iron in the Pittsburg district has also been much heavier than for some time, the sales of the week aggregating 15,000 tons, at prices somewhat lower than had been prevailing. Sales of 4,000 tons of forge have been made at $16, Pittsburg, and one lot of 5,000 tons of Virginia basic, for delivery the remainder of the year was placed at $17.25, netting the furnace only $14.20. The United States Steel Corporation has deferred the buying of Bessemer for the fourth quarter, no quotations on iron for this delivery having been received by the pig iron committee. Whether the corporation's requirements from the Valley furnaces will be as heavy during the last quarter as during similar preceding periods this year, is doubtful, as one new stack at Clairton, in which it owns a half interest, will be blown in during September and in October two stacks at Sharon and two at Donora become available. The pig iron production in the Pittsburg and Valley districts will be greatly curtailed during the present month, as eleven stacks are out for relining and repairs, four being steel corporation furnaces. Two additional stacks are to go out shortly, one at Youngstown and the other at Sharpsville. A new stack at DuBois, Pa., was added to the list of active furnaces this week, while the Cleveland furnace will be making iron within a few days. The demand for steel in the form of billets, tin and sheet bars is not heavy, and the mills that are parties to the billet association are selling not much over half of their surplus production. Steel production is, however, being curtailed by the idleness of two open-hearth plants at Sharon, and Bessemer plants—one at Youngstown and the other at Wheeling. There have been no developments in the week to encourage the market in finished lines. The structural and continuous steel bar mills have curtained production to some extent, while a curtailment in the production of plates will necessarily follow the falling off in the specifications from the steel car manufacturers. One of the leading steel car interests has orders for less than 2,000 cars as compared with over 12,000 a year ago. The demand for merchant pipe is normal and there is no indication that the fall trade will be below the average. The tonnage on the books of the leading interest is larger than a year ago, while stocks are less than-half. The tin plate trade continues prosperous, due to the big demands of the canning interests, but it is doubtful whether present orders will insure full operation for all the mills further than October. Another consolidation of foundry interests is under way. Eight of the leading car wheel foundries in the East, with a daily consumption of 1,000 tons of iron, are to be included in the combination. A shortage of cars is being experienced by the shippers of fuel in western Pennsylvania and West Virginia, due to the withdrawal of a large number of cars from the coal and coke trade to move the crops in the West. Furnaces, however, are experiencing no difficulty in securing an adequate supply of coke.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, Aug 12.

Prices on certain grades of pig iron sought still lower levels during the week, and a number of buyers were induced to place contracts covering their requirements for the remainder of the year. It is estimated that the total tonnage placed aggregates 15,000 tons, which is much larger than has been placed during any similar period this summer. Two round lots of forge iron were placed at $16, Pittsburg, one calling for the delivery of 1,000 tons during the remainder of this month and September, while the other order was for 3,000 tons for delivery over the remainder of the year. One 5,000 ton lot of Virginia basic for delivery the remainder of the year was placed at $17.25, Pittsburg, netting the furnace only $14.20. Sales of No. 2 foundry aggregate nearly 5,000 tons, one order for 1,000 tons for delivery the remainder of the year was placed at $17.50, Pittsburg, while an order for 2,000 tons for the same delivery was placed at $19.10, Pittsburg, special specifications calling for the higher price. Odd lots of No. 2 for early shipment from furnaces, where small stocks have accumulated, however, have been sold at prices ranging from $17 to $17.50. The sales of Bessemer have been limited to small lots entirely, and the United States Steel Corporation's pig iron committee has deferred buying iron for the fourth quarter. With two of its steel plants shut down, and five additional stacks coming in during the months of October and November, it is a question whether requirements for the fourth quarter will be as great as they were for the similar preceding periods this year. At the present time eleven stacks are out of blast in the Pittsburg and the Valley districts, and the production during the present month will therefore be greatly curtailed. In addition, the blowing out of these stacks will take a large tonnage out of the market and will to some extent prevent quotations from seeking a still lower level.

The current demand for steel from mills connected with the billet association has thus far not been great enough to take more than one-half of their surplus, and sales have not averaged much above 5,000 tons a week since the announcement of recent agreed quotations. The Carnegie Steel Co. has shut down several mills at Homestead for repairs, while the entire plant of the Carnegie Co. at South Sharon is idle for the same purpose. While there is a fair demand for structural shapes, it is not sufficient to take the entire output of the mills in this district, and a number of them are not being operated at their fullest capacity. The falling off recently in the steel bar trade has also curtailed the production of the continuous bar mills in this district to a very great extent. While the large agricultural implement manufacturers have not yet covered their requirements for delivery the remainder of the year, it is certain that they will be compelled to buy

shortly in order to have an assortment of sizes in stock when they resume operations in full in October. Specifications on steel plates are also falling off, due to the lull that is being experienced in the demand for steel cars. It is reported that the largest producer of steel cars has orders ahead for less than 2,000 cars, whereas one year ago the books showed orders for more than 12,000 cars. The withdrawal of cars from this district to the West to move the crops has introduced another menacing feature, and shippers of coal and coke in the western part of this State and in West Virginia are experiencing much difficulty in securing a sufficient number to move their product. Thus far the furnaces have not suffered on account of a shortage of coke, but with the blowing in of furnaces now idle, in about a month, a scarcity of coke supply is threatened. It is not true, however, that the furnaces are suffering from a shortage of ore, as the movement from Lake Erie ports this year has been particularly heavy.

The car wheel foundry consolidation which will take over eight of the Eastern plants will purchase the plant of the Keystone Car Wheel Co., at West Homestead, but the other two plants in this district—the Central Car Wheel Co. and the Pennsylvania Car Wheel Co.—whose output is taken by the Standard Steel Car Co. and the Pressed Steel Car Co., respectively, will remain independent.

Pig Iron.—Consumers of forge iron who were in the market last week succeeded in placing their orders at the figure they fixed, namely, $16, Pittsburg. One order for 1,000 tons for August and September delivery was placed at this price, as well as 3,000 tons for delivery the remainder of the year. A new low level has been established for Virginia basic, 5,000 tons having been placed for delivery the remainder of the year at $17.25, Pittsburg. No. 2 foundry is selling at $17 to $17.50, while Bessemer iron is quoted at prices ranging from $17.25 to $18 at the Valley furnace. An inquiry for malleable Bessemer for Western shipment, deliveries running through the remainder of the year, brought out quotations of $17 at the Valley furnace and $16.50 from Ohio river furnaces. The order has not yet been placed. While there is a somewhat better inquiry for both gray forge and foundry irons, the majority of the buyers are content to remain out of the market, and are covering immediate requirements by the purchases of small lots. At present eleven furnaces in this district and the Valleys are out. The steel corporation has four out as follows: One stack at Isabella plant, Pittsburg; No. 3 at Duquesne; No. 3 at New Castle, and the South Sharon furnace. The remaining seven stacks are the Mabel, Claire, Pierce and Stewart at Sharpsville; two Hubbard stacks and Hannah of the Republic Iron & Steel Co. In addition two stacks are going out shortly for relining, No. 3 of the Shenango Furnace Co., Sharpsville, Pa., and No. 2 of the Carnegie Steel Co., at Youngstown, O. Nearly all of the stacks idle at present will resume in September, and in October and November the United States Steel Corporation will have five new stacks coming in, two at Donora, two at South Sharon and one at Clairton. With this additional pig iron capacity, and with the present curtailed demand for finished steel products, it is doubtful whether the corporation's requirements of Bessemer iron will be as heavy as has been the case heretofore. Another new stack producing foundry iron was blown in this week at Falls Creek, near DuBois, Pa., having a daily capacity of 350 tons. We revise quotations as follows:

Bessemer, Valley	$17 50 to 18 00
Bessemer, Pittsburg	18 35 to 18 85
No. 1 Foundry	17 75 to 18 25
No. 2 Foundry	17 00 to 17 50
Gray Forge, Pittsburg	16 00 to 16 25
Chilled Basic, Valley	17 65 to 18 00
Chilled Basic, Pittsburg	18 50 to 18 85

Steel.—The demand for steel billets, sheet and tin bars is not very heavy, the aggregate sales of the mills in the billet association not amounting to much over 5,000 tons a week. This does not take more than one-half the surplus now being offered in the market by these mills. One mill in this district that is receiving more steel than it can consume in its finishing mills is offering a small tonnage in the open market at slightly below the agreed quotations. We quote as follows: Bessemer billets 4x4 inches and slabs up to and including .20 carbon, $27, Pittsburg, Wheeling or Valley, Johnstown, Ashland, Ky., Ironton O., and Lorain, O.; .21 to .60 carbon, $1 advance, and .61 to 1.00 carbon, $2 advance; open-hearth billets up to and including .60 carbon, $28, and over .60 carbon, $29; billets smaller than 3⅞-inch and sheet and tin bars are $1 per ton extra; Bessemer rods, $35.50 to $36 and open-hearth are held at $1 advance.

Ferro-Manganese.—There is little buying of manganese, foreign and domestic being offered in carload lots at $49 delivered at buyer's mill, while small lots are quoted at $50.

Spelter.—The spelter market continues unchanged, and prime Western grades are held at 5.63½c to 5.65c, Pittsburg.

Muck Bar.—We note the sale of 3,000 tons of muck iron at $30 Pittsburg. With the recent lower quotations on gray forge it is believed that the muck iron market will go to $29 and $29.50.

Skelp.—The market continues very quiet, but offerings of iron skelp have been made at slightly lower prices. Grooved iron skelp is quoted at 1.80c to 1.85c and sheared at 1.85c to 1.90c. Steel skelp is held at 1.75c to 1.80c.

Rails and Track Material.—There has been practically no buying of rails for delivery next year during the past week. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds, in carload lots, $39; less than carload lots, $40; 12 pounds, $33.50; 16 and 20 pounds, $32.25 to $33; 25 to 40 pounds, $32 to $32.50. Track material: Spikes, 2.15c to 2.20c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

Bars.—Iron bars are now being quoted almost uniformly at 1.60c, Pittsburg, with freight added to point of destination. This places them on the same basis as steel bars. The continuous steel bar mills in this district are not operating at their fullest capacity at present, as the demand is not nearly great enough to take their output. There has been the usual current buying during the week, but the large Western buyers are still out of the market, although they will be compelled to cover fall requirements during the next three or four weeks. We quote as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.60c, Pittsburg. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

Plates.—The outlook for a heavy consumption of plates on the part of the steel car interests during the remainder of the year is not very bright. One large interest that carried orders on its books at this time last year for over 12,000 cars, today has less than 2,000 cars booked. Specifications from other large plate consuming interests are not being received as freely as the mills would desire and the general situation is much easier, but prices are being firmly maintained. We quote agreed quotations as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16-inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Structural Material.—Owing to the falling off in specifications for structural shapes a number of the mills in this

district are not operating at their fullest capacity. A fair amount of current business continues to be received by the mills, but large contracts are not being considered. We quote: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—Despite the concessions offered large buyers of sheets, the demand has not been increased to any appreciable extent. Independent producers and the American Sheet Steel Co. are making the following quotations on black sheets in 500-bundle lots: No. 28, 2.70c to 2.75c; No. 27, 2.60c to 2.65c; No. 26, 2.50c to 2.55c; Nos. 22 and 24, 2.40c to 2.45c; Nos. 18 and 20, 2.30c to 2.35c; Nos. 14 and 16, 2.20c to 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.55c to 2.60c; No. 18, 2.80c to 2.85c; No. 26, 3.30c to 3.35c; No. 27, 3.55c to 3.60c; No. 28, 3.80c to 3.85c; No. 29, 4.30c to 4.35c; No. 30, 4.45c to 4.50c.

Pipes and Tubes.—There is no apparent falling off in the demand for merchant pipe and from present indications the fall trade promises to be normal. So far as tonnage is concerned the largest producer is in a better condition today than a year ago, the tonnage on the books being larger and the stocks considerably smaller. We quote as follows in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Wrought Iron Pipe. Black. Percent.	Wrought Iron Pipe. Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	65	53	61	50
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	66	54	62	51
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53
Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				
¼ to 8 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3½ to 4 inches	60
4½ to 12½ inches	63

Wire and Wire Nails.—There has been more inquiry during the week from jobbers who are anxious to fill out their stocks for the fall trade and conditions are encouraging for a good demand during the next three months. At a meeting of the cut nail manufacturers held last week ruling quotations were reaffirmed. We quote: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—The demand for the higher grades of steel has fallen off to a considerable extent owing to the falling off in the demand for machinery. The shafting market is quiet. We quote as follows: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots. Tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. Tool steel is quoted 7 cents and upwards, according to the grade.

Old Material.—Puddling mills and steel plants are beginning to come into the market to cover requirements during the next two and three months. As yet the tonnage covered is not heavy, but the buying during the next two or three weeks promises to be fairly heavy. Busheling scrap has been quoted during the past few days at $15.50, gross and heavy melting stock at $18.50, gross.

Coke.—Many shippers of coke in the Connellsville region are experiencing much difficulty in securing sufficient cars to ship their product. With the large number of furnaces out in the Pittsburg and Valley districts there is little difficulty in supplying fuel to those in blast, but when the idle plants resume a coke scarcity at the furnace plants is again threatened. Prices are being held at $3 to $3.25 for strictly Connellsville foundry coke and $2.25 to $2.75 for furnace. Outside furnace coke is held at $1.50 to $2 and foundry at $2 to $2.50. For the week ending Saturday, August 1, the production of the upper Connellsville region amounted to 253,678 tons, a slight increase over the production of the previous week, while the lower region produced 55,580 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, AUG. 11.

Aside from pig iron, the Western metal markets this past week exhibit small points of interest. But the pig iron situation makes up in interest what is lacked elsewhere. It is a rather complex situation, the main doubt being the position of Southern pig. Otherwise there has been a clearing up of uncertainties and the market placed on a basis firmer than at any time this year. This gain in stability has been accompanied by some very heavy buying. During the past two weeks fully 150,000 tons of pig iron has been bought in the Chicago market and judging from the inquiries now being made the buying for a similar period in the future will be also remarkably large, though more scattered. It was noted last week that there had been bought here a very heavy tonnage of malleable iron. There have been further orders placed this past week. It was also noted a week ago that the leading implement interests had bought a lot of 5,000 tons of Southern iron. This week a much stronger statement can be made on that important business. The buying by the implement people has been heavy for both Northern and Southern irons. While the exact tonnage has not been made public, the amount exceeds 50,000 tons. The Northern iron purchased by the implement people was divided and aggregated over 25,000 tons; the iron bought in the South was placed among a number of non-association furnace interests, and amounted to over 20,000 tons. The implement people are still figuring for several round lots of iron, which will probably be closed in a few days. The two leading buyers of the past two weeks, the largest malleable company and the leading implement maker, bought over 100,000 tons of pig iron. And there have been other transactions, lesser by comparison, but in themselves of some special note. The significance of this large buying rests more, perhaps, on what is to follow than in the tonnage already booked, for there are many foundry interests in the West that take their cue in buying iron from the action of the interests named above, waiting patiently until the latter have taken action. It is regarded by the trade as certain that in the next two weeks there will be a large buying of pig iron, for the simple reason that the melters will now be assured that prices have for this movement touched the lowest point and that they will fare the better who do their buying the earlier. The situation would be simplified, were it not for the rather awkward situation in respect to Southern irons.

The leading Southern furnacemen are holding firmly at $13.50, Birmingham, for No. 2, whereas the smaller and independent furnaces have been selling on a basis of $12 to $12.50, Birmingham. The buyers would doubtless take all the iron they can obtain at $12, but they are not yet quite willing to pay $13.50, though what action they will take on that subject in a few days remains to be seen.

The markets for steel and for finished products do not this week bring out much important news. Trade is keeping along at the same moderate pace that has prevailed for months past, with here and there a point of unusual activity. During the past week there has been very little buying of steel. There were bought about 3,000 tons of steel bars, for delivery during the year ending June 30 next. Several thousand tons of merchant steel were bought by large implement manufacturers. No order for steel rails is reported larger than 1,000 tons. Structural material is called for in small lots only. Prices are generally without variation.

Pig Iron.—A curious condition in the pig iron market is that most of the small buying is done on bids, not on quotations made by the furnacemen. The latter have learned by the experiences of the past nine months that, whatever prices they quote, the foundryman will probably be dissatisfied and offer to take the iron a dollar or two lower or defer purchasing. Now he is asked what he is willing to pay for iron and if he names a figure that is regarded as reasonable by the seller, the transaction is completed. The Southern associated furnace interests are doing a quite limited business, consisting of carload to fifty-ton orders, mainly for quick shipments. The non-association makers are selling iron at from $12 to $12.50, Birmingham, for No. 2 foundry. It is intimated that the latter furnaces are now pretty well sold up and in evidence thereof it is clamed that they are buying from the associated interests small but frequent lots of iron at regular schedule. The foundrymen are evincing more interest in the market, but some of them are disappointed that they cannot buy on the basis expected. They had announced that they would buy during the past week, but now say they have put off the purchase for a little while. Even with this postponement of buying of Southern irons there has been a large trade, mainly for Northern irons. One lot of 5,000 tons of malleable iron has been bought and another of 3,000 tons, besides the large order alluded to above. One lot of local foundry iron of 3,000 tons was bought. And in lots running from 200 to 500 tons there has been a good trade, deliveries running throughout the year usually. Quotations are as follows:

Lake Superior charcoal	$21 00 to 21 50
Local Coke Foundry No. 1	18 00 to 18 50
Local Coke Foundry No. 2	17 50 to 18 00
Local Coke Foundry No. 3	17 00 to 17 50
Local Scotch Foundry No. 1	1800 to 18 50
Southern Coke No. 1	16 85 to 18 35
Southern Coke No. 2	16 35 to 17 85
Southern Coke No. 3	15 85 to 17 35
Southern Coke No. 4	15 35 to 16 85
Southern No. 1 soft	16 85 to 18 35
Southern No. 2 soft	16 35 to 17 85
Southern Gray Forge	15 35 to 16 60
Southern Silveries (4% to 5% silicon)	18 35 to 18 85
Southern Silveries (5% to 6% silicon)	18 85 to 19 35
Jackson Co. Silveries (6% to 8% silicon)	20 30 to 21 30
Jackson Co. Silveries (8% to 10% silicon)	21 30 to 22 30
Ohio Strong Softeners	21 00 to 22 00
Alabama and Georgia Car Wheel	25 35 to 26 35
Malleable Bessemer	18 00 to 18 50
Basic iron	16 85 to 17 85

Billets.—Trading in billets this week has been light. There is some inquiry for open-hearth billets, but few are offered. Small lots of forging billets are selling at about $33 and upward.

Bars.—The steel bars offered a week ago at a concession of $1 per ton are no longer in the market. One sale is reported on 400 tons at 1.57½c, Pittsburg, but the mill which made the sale has since withdrawn the quotation. The trade in steel bars has been heavier this past week, implement interests closing for wants during the year, aggregating 3,000 tons. Specifications on iron bars are improving somewhat, but new deals are not important. Iron is now commonly sold at 1.60c, Chicago, though small orders are still selling at 1.65c. One lot of skelp was sold here at 1.60c, Pittsburg. We quote mill shipments, Chicago delivery: Bessemer steel, 1.76½c; angles, less than 3x3, 1.86½c base; hoops in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c; iron 1.60c to 1.65c. Quotations from store, steel, 2c; iron, 2c to 2.10c; hoops, 2.40c to 2.50c; angles, 2.25c rates.

Sheets.—Sheets are moving moderately well at the old prices, which are being maintained. Orders are mainly for nearby wants only. We quote mill shipments, carload lots, Chicago delivery, as follows: No. 27 black, 2.75c to 2.85c; No. 28, black, 2.85c to 2.95c. Galvanized 75 and 10 to 75 and 10 and 2½ percent. On lots from store, we quote No. 27 black, 2.95c to 3c; No. 28 black, 3.05c to 3.10c. Galvanized, 75 percent to 75 and 2½ percent.

Plates.—The mills have specifications sufficient to run full time, but there has been little new business of a noteworthy description booked during the past week. We quote mill prices, Chicago delivery, as follows: Tank steel, ¼ inch and heavier, 1.75c; flange steel, 1.85c. Prices for lots from stock: Tank steel, ¼ inch and heavier, 2.15c to 2.25c; 3-16, 2.25c to 2.35c; No. 8, 2.30c to 2.40c; No. 10, 2.35c to 2.45c; flange steel, 2.40c to 2.50c.

Structural Material.—Little work of large proportions has appeared. Many plans are being withheld, pending a clearing of financial skies. One Chicago building, which it is said will go through and which may require 1,000 tons of shapes, is the Bush hotel on the north side. From store there is a steady trade totaling reasonably well. We quote mill prices, Chicago delivery: Beams and channels, 16 inches and under, 1.75c; 18 inches and over, 1.85c; universal plates, 1.75c; angles, 3x3 and larger, 1.75c; tees, 3x3 and larger, 1.80c; zees, 1.75c. Lots from store, 2¼c per pound.

Merchant Steel.—Regarding the season as a whole, it is backward, but the buying during the past week has been heavier than at any time this summer. Perhaps the largest order closed was one for 3,000 tons, the purchasers being implement makers. There are many inquiries and the activity promises to continue. The market is firm. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 and 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—The tonnage of business booked week after week does not materially change. It is a good summer trade and the mills are kept busy. We quote carload lots, mill shipments, random length, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ⅜ in. inclusive	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	71.85	61.85
7 to 12 inches inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—There is some impairment of local trade on account of forced idleness at a number of the boiler shops, but out of town orders are seasonably good. Quotations below are on carload lots, mill shipments, f. o. b. Chicago. On less than carload lots, 12½ percent is to be added:-

	L. W. Steel. Percent.	C. C. Iron Percent.
1 to 1½ in.	43.35	38.35
1¾ to 2½ in.	55.85	35.85
2¾ to 5 in.	60.85	45.85
6 to 13 in.	55.85	35.85

For lots direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron Percent.
1 to 1½ in.	40	35
1¾ to 2½ in.	50	32½
2¾ to 5 in.	57½	42½
6 to 13 in.	50	32½

Cast Iron Pipe.—Business is improving, in the sense that orders are more numerous and that buyers are showing a revived interest in the market, but current transactions are usually for moderate tonnages. Car loads are quoted, f. o. b. Chicago, 4-inch water pipe, $31; 6-inch, $30; 8-inch and upwards, $30; gas pipe, $1 a ton higher.

Rails and Track Supplies.—Business in steel rails has been light this past week. A fair trade has been done in lots running from several hundred tons up to 1,000 tons, largely for electric railway work. Prices are without change. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; rails, 25 pounds, $32 to $34; 12 pounds, $39 to $40; regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c (out of store, carload lots, 2.35c to 2.45c rates); second quality, 2.10c; track bolts, 3½x¾ with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3c to 3.10c, with usual differentials for other sizes.

Wire and Wire Nails.—There is moderate trading in wire and nails this week. The consumers are not asking for more than their present wants as a class, though an occasional good lot appears. Plain wire is in excellent demand. Prices are firm. Quotations to jobbers, Chicago delivery, are as follows: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in small lots; galvanized, carloads, $2.40; smaller lots, $2.50c. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90; staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; small lots, $2.70. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—The market is slowly settling down, perhaps in sympathy with pig iron. It is now possible for the foundryman to buy for future shipments, Connellsville product, at $3, and there are reports that that quotation has been shaded. For immediate shipment, Connellsville furnace coke may be obtained at $2.50, ovens. Furnace coke of West Virginia make is freely offered at $2 ovens.

Old Material.—There has been some further decline in the price of old material this past week for almost all grades. There seems to be an absence of buyers and there are enough eager sellers to give to the market this depressed character. Rolling mill grades are especially weak and the buyer can pick up almost any kind of scrap desired below the quotations of a week or two ago. Dealers' selling prices in gross tons are as follows:

Old iron rails	$19 00 to 20 00
Old steel rails (mixed lengths)	16 00 to 17 00
Old steel rails (long lengths)	18 50 to 19 50
Relaying rails	28 50 to 30 00
Old wheels	19 00 to 20 00
Heavy melting steel	15 00 to 16 00
Mixed country steel	12 00 to 13 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$14.25 to 14.50
No. 2 R. R. wrought	13.75 to 14.25
Shafting	15 00 to 16 00
Dealers' forge No. 1	12 50 to 13 50
No. 1 busheling and wrought pipe	11 50 to 12 00
No. 1 cast	14 00 to 14 50
Heavy cast (300 pounds and over)	10 00 to 10 50
Country malleable	12 50 to 13 00
Iron axles	19 00 to 19 50
Steel axles	17 00 to 17 50
Cast borings	5 50 to 6 50
Mixed borings, etc.	5 50 to 6 50
Wrought turnings	10 50 to 11 00
Machine shop turnings	10 50 to 11 00
Iron axle turnings	11 50 to 12 00
Steel axle turnings	11 00 to 11 50
Stove plate and light cast scrap	10 00 to 10 50
Old iron splice bars	15 25 to 15 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Aug. 11.

Indications are that there will be a decided reduction during the remainder of the season of navigation in shipments of ore on the part of the steel corporation, which last month shipped two-thirds of the total, and other interests. Almost no sales of ore are being made and it is not anticipated that large sales will be effected. Unsold ore will not be brought down and shipments must decrease. It will not be surprising if the total shipments for this season fall below those of last year by 1,500,000 tons. It is not believed, however, that there will be any big slump in ore freights, which are still firm at 80 cents from the head of the lakes, 72½ cents from Marquette, and 60 cents from Escanaba. It may also be positively stated that present prices of ore will not be reduced this year.

Pig Iron.—While some of the smaller foundries are busy, reports indicate that the demand for castings has diminished and the total output is much below that of this time last year. Contracts for many thousands of tons of iron not promptly delivered have been canceled and still foundries are not buying except in small quantities for immediate requirements. Of such business, there is, however, a growing volume and often the buyer is insistent that there shall be no delay in making delivery of the iron. A large agricultural interest in New York State has purchased a round tonnage of malleable and No. 2 foundry, but the price is not announced. Southern iron is showing more firmness. The usual price is $12, Birmingham, or $16.35, Cleveland, but some orders of favorite brands have been placed at association schedule prices, based on $13.50 for No. 2. We quote, f. o. b. Cleveland, with the exception of gray forge, which is quoted at Valley furnace:

Bessemer	$18 35 to 18 60
No. 1 Strong Foundry	17 75 to 18 25
No. 2 Strong Foundry	17 00 to 17 50
No. 3 Foundry	16 50 to 17 00
Scotch No. 1	18 50 to 19 00
Scotch No. 2	17 75 to 18 25
Gray Forge, Valley furnace	17 00 to 17 50
Lake Superior charcoal	23 00 to 23 50

Coke.—There is more talk of car shortage, but it has not delayed shipments to any great extent. Connellsville is firm at $3.25 for foundry, while cokes high in sulphur can be had at much lower prices.

Finished Material.—The market is very quiet, but prices are pretty firm. Independents have, however, taken a considerable tonnage by cutting prices on plates, sheets and light rails. Specifications against contracts are coming in nicely. Bar iron is still weak, with 1.60c Cleveland as the usual quotation and rumors of 1.55c. The price of steel remains at 1.60c for Bessemer and 1.70c for open-hearth, and orders are not numerous. Out of stock iron and steel are selling at the same price, 1.90c. The sheet situation is quiet. The prices of the principal producer through jobbers continue as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12-14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75 and 5 off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.60c to 2.70c; Nos. 18-20, 2.75c to 2.85c; Nos. 22-24, 2.85c to 2.95c; Nos. 25-26, 2.95c to 3.05c; No. 27, 3.05c to 3.15c; No. 28, 3.15c to 3.25c.

Old Material.—There has been a little buying and prices are tending downward. Heavy steel is especially weak. One dealer purchased a lot of such material at $15 gross ton. We quote as follows, f. o. b. Cleveland, all gross tons:

Old iron rails	$19 00 to 20 00
Old steel rails (over 6 feet)	18 00 to 19 00
Old steel rails (6 feet and under)	17 00 to 18 00
Old car wheels	17 00 to 18 00
No. 1 R. R. wrought	17 00 to 18 00
Mill scrap	14 00 to 15 00
No. 1 machine cast scrap	14 50 to 15 00
Iron axles	22 00 to 23 00
Steel axles	22 00 to 23 00
Axle turnings	14 00 to 15 00
Wrought turnings (free from cast)	13 00 to 14 00
Cast borings	7 00 to 8 00
Uncut wrought iron boilers	9 00 to 10 00
Steel boiler plates	14 00 to 15 00
Grate bars	10 00 to 12 00
Pipes and flues (clean)	14 00 to 16 00
Tank iron	14 00 to 16 00
Hoop and band iron	10 00 to 12 00
Sheet iron	8 00 to 9 00
Wrought drillings	12 00 to 13 00
Malleable iron (railroad)	18 00 to 19 00
Malleable iron (agricultural)	15 00 to 15 50
Stove plate	11 00 to 12 00
Heavy steel	15 00 to 16 00

CINCINNATI.

Aug. 11.

The market for coke is showing more activity and the tone of the situation seems steadier. The current quotation for good brands of Connellsville coke is $3 at ovens, but it is reported that some business has been done as low as $2.75 at ovens. There is more inquiry and sellers are booking more business.

Pig Iron.—The market has an appearance of steadiness which seems to be based on the belief that there is not much more cheap iron to be had. During the week some quotations have been made as low as $11.50 Birmingham for No. 2 foundry, but today there does not seem to be any iron to be had below $12 Birmingham. In the past day or two several sales of fair size have been made on the $12 basis, and for these orders there was active competition so that it would appear that $12 was the best that could be done. This refers to spot transactions or quick shipment iron. In a general way the market is fairly active and agents of independent furnaces have taken more business than in the recent past. All talk of the association furnaces not maintaining their schedule has been quieted by the fact that no iron of any association furnace can be found upon the market at less than the agreed price. There have been heavy sales of malleable bessemer iron and there is an inquiry in the market for 4,000 tons of No. 2 foundry iron from an Ohio agricultural implement concern. The impression in the trade is that there has been enough quick shipment iron sold recently to take up most of the cheap lots available and that $12 Birmingham can now be quoted with confidence. It is stated that some independent furnaces were forced to buy some iron from association furnaces to fill some orders taken for prompt shipment, and they paid the schedule, as it could not be bought for less. While these features give the situation a steady appearance today it is also a fact that buyers are still inclined to buy sparingly and are talking the market down. Sellers are suspicious of the market, and when their quotation does not get the order they are ready to believe that they were undersold. Buyers have had the market so long that sellers are slow to gain assurance. In Southern Ohio irons $15 to $15.50 for No. 2 foundry is still the market. The following are the prices current f. o. b. Cincinnati:

Southern Foundry No. 1	$15 50 to 16 00
Southern Foundry No. 2	15 00 to 15 50
Southern Foundry No. 3	14 50 to 14 75
Southern Foundry No. 4	14 25 to 14 50
Southern Foundry No. 1 soft	15 50 to 16 00
Southern Foundry No. 2 soft	15 00 to 15 50
Gray forge	13 50 to 14 00
Northern Foundry No. 1	16 65 to 17 15
Northern Foundry No. 2	16 15 to 16 65
Southern car wheel iron	26 25 to 27 25

Finished Material.—There is a better tone to the market this week with more demand in a jobbing way and some good sized inquiries. One inquiry for a 2,000-ton lot of iron bars is in the market for a point in Ohio. In structural iron there is a good demand and specifications on contracts are more liberal and there is more new business in sight and being taken. The action of the leading interest in guaranteeing prices on steel bars has brought in more business and opened up promising correspondence. The general market from the standpoint of the small dealer to the leading interest is reported as more active, but there are no changes in quotations and on iron bars the figures current indicate easiness. In bar iron better than 1.70c base can be done and 1.67c has been mentioned, but the ruling quotation on carload lots is 1.73c base, the same as for steel. Iron bars, car lots, are quoted at 1.73c to 1.75c base, half extras. Steel bars remain at 1.73c base, half extras with the retail price 2c base, half extras, for both out of store. Galvanized sheets are being quoted at 75 and 5 percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.10c; No. 27, 3.20c; No. 16, 2.65c; No. 14, 2.55c; No. 12, 2.45c; No. 10, 2.35c. Tank plates are firm and sell out of store at 2.15c for ¼-inch and 2.25c for a 3-16-inch. Beams and channels are quoted at 2.15c to 2.25c from stock, and angles at 2.15c and 2.25c for base sizes. In merchant pipe there is a fair demand at steady prices and the schedule is maintained as the independent mills are apparently well sold up.

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	68.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12 inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	35.2
1¾ to 2½ inch	54.2	34.2
2¾ to 5 inch	59.7	44.2
6 to 13 inch	54.2	34.2

Old Material.—The market continues dull and unchanged. There is very little trading. Dealers are waiting for more settled conditions. We quote:

Old No. 1 railroad wrought, net tons	$14 00 to 15 00
Cast machine and foundry, net tons	12 00 to 13 00
Old iron rails, gross tons	19 00 to 20 00
Old steel rails, gross tons	17 00 to 18 00
Old short lengths, gross tons	14 50 to 15 50
Old iron axles, net tons	20 00 to 21 00
Stove plate, net tons	9 00 to 10 00
Wrought turnings, net tons	11 00 to 12 00
Cast borings, net tons	6 00 to 7 00

PHILADELPHIA.

Aug. 11.

There is more inquiry for pig iron, steel and old material, but no large lots are taken and there is still lack of confidence as to prices, which have a wide range. Large buyers are not sufficiently confident even at the inside figures as to place orders, except for smaller quantities than they usually take. Still, the aggregate movement is larger, and it is rather expected that the volume of business will increase, even if prices go off a little more.

Pig Iron.—Most of the sales are for early delivery and for car load lots. Small lots of No. 2 X are quoted at $17.25 to $17.50, but much better could be done if large buyers were in the market. We quote as follows: No. 1 X foundry, $18 to $18.50; No. 2 X foundry, $16.75 to $17.75; No. 2 plain, $15.75 to $16.50; No. 3 foundry, $15 to $15.50; gray forge, $15.50 to $16.50; basic, $16 to $16.25.

Steel.—There is a great deal of steel wanted and inquiries indicate that stocks in consumers' yards are low. Sales are rather slow, however, owing mainly to differences of opinions in regard to values. Makers quote $28 at mills (local) as a bottom figure, but large consumers think deliveries should be made to them at that figure, the result in the meantime being sales at $28.50, and from that to $29 for small lots delivered. Foreign steel is being offered at Western points at competing prices, presumably on account of cut rates on freight, ocean tonnage being very light at the present time.

Finished Material.—Finished material is dull and mills are doing all they can to secure new orders, but very few large lots are called for these days. The bar iron trade is distinctly bad, the demand being much below what is required to keep the mills employed, so that of necessity work is more or less irregular. Prices of the last mentioned are no longer subject to pooling arrangements, so that each mill makes a price according to its own ideas of the situation. Others are unchanged as follows for city or nearby deliveries: Plates—Small lots, 1.80c to 1.85c; carload lots, ¼-inch and thicker; 1.75c to 1.80c; flange, 2c; marine, 2.10c to 2.15c; fire box, 2.20c to 2.25c. Bars—Prices for carloads are usually quoted at from 1.65c to 1.70c for refined iron and 1.70c to 1.75c for steel bars. Structural material—Beams, angles and channels, ordinary sizes, 1.73½c to 1.80c for carload lots, with the usual addition for smaller quantities.

Old Material.—There is more inquiry, but sales are few. We quote: Old steel rails, $18.50 to $18.75; miscellaneous heavy steel scrap, $17.75 to $18.25; low phosphorus scrap, $26 to $27; old steel axles, $21 to $22; old iron axles, nominal, $23 to $24; old iron rails, nominal, $19.50 to $20.50; old car wheels, nominal, $20 to $21; choice scrap railroad No. 1 wrought scrap, $17.50 to $18.50; country scrap, $15.50 to $16; machinery cast scrap, $17 to $17.50; No. 2 light scrap (forge), $17 to $18; No. 2 light scrap (ordinary),

$12 to $13; wrought turnings, $13 to $13.50; wrought turnings, choice heavy, $14 to $14.50; cast borings, $8.50 to $9; stove plate, $12 to $12.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Aug. 11.

Pig Iron.—The market during the past week has been more active than at any time during the past two months. A large tonnage has been placed, but it has all been in small lots. Opinions differ as to the construction to be put on the buying which has taken place, some contending that it simply meant the replenishing of stocks that had become greatly depleted. Those who talk this way do so because of the many cases where immediate delivery was earnestly asked. On the other hand some insist that it means that many buyers have become tired waiting for lower prices, and have come to the conclusion that present quotations are inviting. This is especially true of Northern irons, in which the greatest activity has been noted. Many buyers, reading published reports that Northern No. 2 X is selling at $16.50 delivered, have been beseeching local sales agents for some good tonnage at that figure, but have been disappointed. It is stoutly maintained here that $17.50 is the best that can be done, while there are some who ask higher. Southern irons are in good request, advices from a leading Birmingham interest reporting its general sales to have been larger during the past fortnight than for any similar period during the past two months. Gossip of $12 for No. 2 foundry, Birmingham, basis, is still indulged in, and the hope that it will eventually be reached is strengthened by reports that some business has already been placed at that figure. These are denied here, however. It is expected that a meeting of the associated furnaces will be held within two weeks at the latest. Data concerning the present and prospective situation for submission at it, have been solicited from sales agents throughout the country. New York prices are as follows: Northern No. 1 X foundry, $17.25 to $18; No. 2 X foundry, $16.50 to $17.50; No. 2 plain, $16.25 to $17; Southern No. 1 foundry, $17.25 to $17.75; No. 2 foundry, $16.75 to $17.25; No. 3 foundry, $16.25 to $16.75; No. 4 foundry, $15.75 to $16.25.

Rails.—The tonnage for next year being placed is considered unusually good for this time of the year. There are still a large number of consuming interests to be heard from, however. We quote $28 at mill for standard sections,

Billets.—Importers here state that the importation of foreign billets has ceased, because they have been given to understand that the pool will meet any price they name. Canadian interests have the same advices.

Finished Iron and Steel.—A quiet market must be noted in all finished products. In structural material current orders are for small lots. Some large orders which it was thought would be placed in the near future, will, it is said, be held over until September. The New York Central Railroad has an inquiry out for 10,000 tons for bridge purposes. It is now believed that improvements planned by the company in this city will require 30,000 tons, instead of 20,000. Small mills in their anxiety to do business are shading orders. Bars have developed some strength during the week, and some excellent buying has taken place among those who have been persistently holding off for lower prices. There is no change in sheets or plates, and only a fair trading in both can be noted. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.80c to 2c; flange, 2c to 2.10c; firebox, 2.25c to 2.30c; refined iron bars, 1.75c to 1.80c; soft steel bars, 1.70c to 1.75c; steel sheets, in car loads, New York, No. 28, black, 2.90c to 3.05c; galvanized 75 and 2½ off.

BIRMINGHAM, ALA.

August 11.

Numerous inquiries are being received by the iron makers in this section and some fair business is resulting therefrom; but it seems that what are termed "Association prices" are yet too high to appear attractive to buyers. Sales have been made as low as $1.50 under such prices, or say on a basis of $12, Birmingham, for 2 foundry iron—some independent furnaces having sold several lots, so it is reported, at this figure. The coal and iron operators still have their attention drawn chiefly to the adjustment of a scale of wages for coal mining, to be effective from July 1, 1903, or rather from the first of August, as there was practically no coal mined by the union miners during the entire month of July. Judge Gray, of Wilmington, Del., arrived here last Saturday night and the arbitration commission is now in session. The commission is composed of Mr. Charles McCreery, vice president and general manager of the Tennessee Coal, Iron & Railroad Co., and Col. R. H. Pearson, president and manager of the Central Coal Co., chosen by the operators, and Mr. T. L. Lewis and Mr. W. R. Fairley, chosen by the United Mine Workers, with Judge Geo. Gray acting as the umpire. The entire question as to what shall constitute the new wage scale will doubtless be arbitrated, though the miners insist there are only a few points to be passed upon, the principal ones being the difference of five cents in the maximum figures presented by the operators and those stated by the miners, the eight-hour day, two-weeks' pay-day, differentials between different mines, etc. It may require practically the entire month of August to arrange the new contract.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Aug. 11.

Pig Tin.—After being strong all the week, with values showing a decided upward tendency, in consequence of the continued scarcity of spot tin, the market declined yesterday, and closed easy today, speculative interests making considerable capital out of the exceptionally light demand from consuming sources. In London the market has been firm, but the price of futures is taken to mean that the outlook is not looked upon favorably there. Today's closings at the Metal Exchange were as follows: Spot, 28.60c to 28.65c; August, 28c to 28.25c; September, 27.60c to 27.80c. London's closings today follow: Spot, £127 10s; futures, £123 15s. Arrivals for the month to date amount to 427 tons, with 2,650 tons afloat.

Copper.—The market continues dull, and "official" prices have been lowered from ⅛c to ¼c, with little difficulty experienced in getting better inducements in the open market. Buying in large lots is unknown, consumers feeling that the statistical situation ought to cause a decline in prices. In London, the market has been firm, and prices are about the same as when we last quoted them. The closing prices at the Metal Exchange today were as follows: Lake, 13⅛c; electrolytic, 13c; casting, 12¾c. London's closings today follow: Spot, £58; futures, £56. Exports for the month to date aggregate 1,781 tons, against 2,887 tons afloat.

Lead.—Unchanged here at 4.20c for spot, and 4⅛c for August. St. Louis is slightly higher at 4⅛c. London is still £11.

Spelter.—Is firm at 5¾c to 5⅞c for spot, and 5¾c for August. St. Louis unchanged at 5.60c. London is slightly lower at £20 5s.

Antimony.—Cookson's is 7½c, Hallett's 6½c, and outside brands, 6¼c.

Quicksilver.—Still quoted at $47.50 per flask of 76½ pounds in lots of 100 flasks. London unchanged at £8 2s 6d.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Aug. 11.

Trading in the metals has been slow. Copper is fractionally lower, Lake selling as low as 13c and castings at 12¾c in carload quantities, small lots ¼c to ½c higher. Lead is only moderately active. Old metals are on the downward road. Pig tin is quoted 29c; pig lead, 4.25c in 50 to 100-ton lots, and 5c to 5¼c in lesser quantities; spelter, 5½c in carload lots, and 6c to 6¼c in lesser quantities; sheet zinc, 6¼c; antimony, 10¾c to 11c for Cookson's, and 9¾ for Hallett's. We quote old metals as follows: Copper wire, 11¼c; heavy copper, 11¼c; light copper, 10¼c; heavy red brass, 11½c; light brass, 10¼c; red turnings, 9¼c; yellow turnings, 7¼c.

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G. H. GARDNER, President and Treasurer,
JOHN A. PENTON, Vice-President,
A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - - EDITOR.
ROBERT I. CLEGG, - - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - - - - ASSOCIATE EDITOR.

CHICAGO: 1115 Monadnock Block, GEO. H. GRIFFITHS, Manager.
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THE ORE ASSET OF THE STEEL CORPORATION.

The intricate system of bookkeeping necessary with a billion and a half dollar corporation has prevented all but those who have made a minute study of the subject from forming an accurate idea of the changes which have occurred in the United States Steel Corporation's position in the two and a quarter years in which it has been in existence. Such a minute study is the more necessary from the fact that the basis of valuation on which the different properties were taken in has now become absolutely no criterion of the actual values of the properties as aggregated. The proportionate parts of the total value of the corporation's properties as now lined up which are contributed by each individual are in some cases much higher, and in other cases much lower, than the basis on which they were acquired.

Thus by a process quite exact, but too long to reproduce, it can be computed that, on the basis on which the outside one-sixth interest in the Oliver Iron Mining Co. and the Pittsburg Steamship Co. was acquired, subsequent to the corporation's formation, the value of the five-sixths owned by the Carnegie Co. was equivalent to but 11.56 percent of the total value of properties controlled by the Carnegie Co. It can hardly be claimed that after the corporation was formed the outstanding one-sixth was worth proportionately less than the five-sixths originally acquired, yet it is well recognized that the ore thus acquired is now worth vastly more than one-seventh the remaining Carnegie properties. The same is true of the coke properties and of the Rockefeller ore.

On the other hand, such properties as those of the tin plate, steel hoop and sheet interests cannot, on the basis of earnings, be rated worth as much as was paid for them, their contribution to the steel corporaton being much in the way of furnishing an outlet for steel produced by the other branches.

The large amount of "water" in the corporation's securities was represented by book values for mineral properties very much in excess of any which before the corporation's formation had been assigned to them. It became a question then of the corporation's ability to realize on these mineral properties the values thus assigned. A true understanding of the case was much beclouded by statements made before the Industrial Commission and in the Hodge litigation, which statements by no process of reasoning could be reconciled with the interest and dividend obligations which the corporation had assumed. Thus the ore and coke properties were put as being equal to four-sevenths of the corporation's securities issued at one time, while at another time it was intimated that the coke properties would last 30 years and the ore properties "perhaps 60 years." It requires no involved process of reasoning to deduce that if these were the facts it would require an enormously high rate of return on ore and coking coal as they are taken out of the ground to maintain interest and dividends on the securities which appeared to have been issued against them. If a ton of ore is to remain in the ground for 60 years, and yet have a security issued against it on which interest or dividends must be paid every year for 60 years, then the realizable value of that ton of ore must be extremely high when it is finally taken out of the ground, or its present value, as computed from the realizable value 60 years hence, must be extremely low. This, in a nutshell, was the dilemma found by those who attempted to study the corporation from the standpoint of information furnished.

As shown by the operations of two and a quarter years, the real position of the corporation is quite different. Its mission is, not to rely upon a supply of minerals for half a century to come, but to convert these minerals as rapidly as possible into cash, to be invested in plant continuously earning profits.

It has been customary to assume that the corporation's ore in sight amounted to about 700,000,000 tons, with a book value of a dollar a ton. In 1902 the corporation mined 16,000,000 tons of ore, and with not a particle of increase, this rate would exhaust 700,000,000 tons of ore in 44 years. There is every reason to believe, however, that the rate of mining will increase, and it can hardly be considered extravagant, in casting about for a measure of the probable increase, to take that year in the past which, compared with the total ore shipments in 1902, shows the smallest rate of increase in the interval. That year was 1890. If we take 1890, we take that year in the past which will show the smallest rate of increase for 1902. In 1890 the Lake Superior shipments were 9,003,725 tons, and in 1902, 27,571,121 tons were shipped. This shows an average annual increase, one year over the preceding, of almost an even 10 percent. Now, if we assume an average annual increase for the steel corporation of 10 percent, then 700,000,000 tons will have been mined in seventeen years, beginning with 1902. On such a basis of computation the year 1918 would see the last of 700,000,000 tons mined by the corporation. In that comparatively short period whatever of actual value there is in the properties which are set down at a book value of $700,000,000 would be realized, and the funds, if proper methods were followed, invested in actual continuous revenue-producing plant, barring that portion which may properly be used to retire bonds.

It is of paramount importance, then, to observe whether the sinking funds, depreciation and reserve

accounts, and surplus each year harmonize with the rate of mineral exhaustion. If they do, then the corporation has the opportunity to make the required conversion of minerals into plant.

On the basis of ore prices realized this year and the three preceding ones, it appears that the miner who owns his property in fee has been realizing about $2 a ton clear, and one who mines on royalty only slightly less than this. That price, if maintained, is an amply sufficient realizable value to write off a book value of one dollar, if the operation is concluded within a couple of decades or so. It is entirely insufficient if the operation requires half a century. In the latter case, the burden of maintaining interest and dividends on the securities would fall largely on the manufacturing plants, and that they would be unable to stand this burden has very properly been the fear of those who doubted the corporation's success. The reasoning as applied to ore applies equally to coking coal, in its minor importance.

A summary of the various appropriations of the steel corporation and the surplus accumulated in two years and three months shows that so far the realizations have been extremely liberal to take up the proportion of minerals exhausted. Condensing into one item the sinking funds against bonds of subsidiary companies, the U. S. Steel first 5's, the depreciation and extinguishment funds, the extraordinary replacement funds, and the special depreciation and improvement fund, and adding the surplus currently accumulated, we have the following:

	All appropriations for sinking fund and depreciation.	Current surplus.
1901, nine months	$11,958,994	$19,414,497
1902, calendar year	27,814,389	34,253,657
1903, first half	8,905,229	17,037,047
Total, 27 months	$48,678,682	$70,705,201
Annual average	$21,634,970	$31,424,534
		21,634,970
Total annual average		$53,059,504

This total annual average of $53,000,000 is arrived at after over $20,000,000 a year was spent on ordinary repairs and maintenance, and after all interest and dividend charges against all securities and all other expenses were fully met. The figures here presented are taken from reports which are succinctly certified to by the chartered accountants, and as to the accuracy of which no question has been raised in any quarter. Roughly speaking, the amount is sufficient to replace, by manufacturing plants, about two and a half times the book value of the mineral properties annually exhausted. Comparing this $53,000,000 with the total securities of about $1,400,000,000, there is found a ratio of 1 to 26.4. A deposit table shows that one dollar, deposited each year, with compound interest at 5 percent, will equal in 17 years $27.13; so that if $53,000,000 is invested in properties each year, earning only 5 percent, the whole $1,400,000,000 will be equaled. The period of 17 years in which manufacturing properties can be duplicated may be considered rather long; but there is ample provision against this in that the computation is based on no rate of increase in ore mined, which would carry the ore for 44 years, whereas it is figured as duplicated in 17 years. Nor is it fair to assume that the corporation cannot spend its money to better advantage in manufacturing properties than to have it earn only 5 percent annually.

The position of the steel corporation therefore is that, much more rapidly than its own public utterances would indicate, it is converting its unwieldy and highly valued mineral properties into current paying investments. Its future hangs, not upon the developments of half a century, but on the developments of, say, another decade. A very few years will place it in an impregnable position, or will seriously involve it. Instead of being a new and untried experiment, it seems already to have fought with signal success a third or a fourth of its life battle.

CONSULTING THE CYCLES.

Those who build fine spun theories of trade moving in intricate cycles more often get their reward from complacent self satisfaction than from the acceptance of their theories by the public. It is generally about the time that history is making ready to repeat one of her sudden changes that men come to the conclusion that the then order of things has come to stay. It was just on the eve of what had been a four-year period in which raw steel had averaged double its price in the preceding three years that the trade acquiesced in the pronouncement of Andrew Carnegie that steel would never but for the briefest period depart from a price of about three pounds for two cents. It was just on the eve of a restoration of the high price after the shortest intermission that the trade with equal facileness accepted another dictum, that the American iron trade was either a prince or a pauper—although James M. Swank expressed the same idea perhaps more exactly twenty years ago when he said "we have either a fever or a severe chill."

It would appear, in fact, that we do little but change our views, based on the immediate present, as soon as that present has become a past. It is not so with those who reason upon cycles. They take a long view of things and revel in expanse of time. In the peculiar situation in which the iron trade has found itself the past few months and the sharp differences of opinion expressed as to the outcome, one feels more than ordinarily inclined to consult the cycles. Now it cannot be questioned that from 1893 to the present we have had a repetition of the years following 1873. There was a long continued stagnation, with prices falling—not rising—until four or five years after the crash the lowest were made; then in each case there was not a gradual but a sudden recovery. It was as though one awoke to find prosperity arrived overnight. The pessimists who look for a period of several years before the trade can now right itself are misapplying a lesson learned from the seventies. It is in the eighties that the parallel is to be found. A review of the iron trade of 1882 would almost do for 1902. The annual statistical volume for that year points out that, "the extraordinary activity in our iron and steel industries which had commenced in 1879 had culminated early in 1882, when the wants of consumers became less urgent and prices generally began to decline." Move the dates 20 years forward and make one slight change, saying "late" in 1902 instead of "early" and no words could be framed to more exactly describe what has just happened. One is encouraged to look forward from 1882 and note what then happened. There was a mild decline in pig iron production, so that for three successive years no records were broken, although the average of the three years slightly exceeded the average of the three preceding years; steel production followd the same course; prices merely settled slightly, and in 1886 production started breaking records again, until when the final smash came in 1893 a longer period of marked prosperity had been experienced than that beginning with 1879.

The Labor Situation.

RAILROAD EMPLOYES' WAGES INCREASED.

When the Chicago, Rock Island & Pacific Railroad a few days ago conceded the trainmen and conductors of its lines an increase of wages, it brought to a close a general movement for high pay and better working conditions that has benefited over 40,000 men and added $10,000,000 to the yearly pay rolls of the railroads of the West. The Rock Island was the last one to make terms with its train employes and, excepting the Wabash, was the only one actually threatened with a strike. Its action consists of an increase that amounts to an average of 15 percent for freight men and 12 percent for passenger men. The general movement, of which the Rock Island controversy was a part, began a year ago in Kansas City. Counting subsidiary lines, over fifty railroads, employing 40,000 men, have put the new schedule into effect.

LABOR NOTES.

The employes of the Harbeson-Walker Co., at Olive Hill, Ky., have been granted an increase of 15 cents a day. The strikes at the company's plants at Portsmouth, Sciotoville and Firebrick, Ky., continue. At Portsmouth a stockade has been erected about the plant and yards and quite a force of men are being kept at work despite the vigilance of the strikers' pickets.

The crew of the little plate mill at the Portsmouth Steel Co. plant struck last week for an increase of wages, and this department was shut down. A conference has been arranged and a speedy settlement is expected.

The striking boilermakers of the Omaha railroad shops have returned to work. They will receive $3.60 a day for 10 hours' work in the St. Paul and Sioux City shops, and $3.45 a day in roundhouses where boiler repairing is done.

The molders of the Home Stove Co., Indianapolis, have been granted an advance of 10 percent and have returned to work. A similar concession has been granted to its employes by the Indianapolis Foundry Co.

By unanimous vote of the 3,500 members of the Housesmiths' Union, New York, the proposition of the Iron League for a conference was rejected, the walking delegates were declared the only official conferees of the union, and the building trades war was re-opened with new vigor. This action was a complete victory of Sam Parks, the labor agitator who is now resting under the charge of extorting money from a number of employers.

The officers of the Springfield Boiler Works, Springfield, Ill., have received an offer to locate their plant in Kansas City. The strike has been in progress at the works for some time and the Kansas City people say they will guarantee that there will be no trouble with strikes if the works are removed to that city.

A number of the employes of the American Hardware Co., New Britain, Conn., are on a strike, which includes men from both the Corbin and Russell & Erwin foundries. The strike was declared because it is alleged the American Hardware Co. is not paying the scale of wages agreed upon.

The Vulcan Iron Works Co., Toledo, informs us that there has been no strike of its employes, as reported.

John C. Weller, foreman in the cornice factory of E. A. Rysdon & Co., 41st and Waller Sts., Chicago, shot and killed a union cornice-maker named Michael Sweeney, Aug. 6. Weller was attacked by four men, who are believed by the police to have borne a grudge against him for remaining at work while most of his former fellow employes had gone on a strike. Weller, being foreman of the plant, had repeatedly explained to his critics that although a member of the union, he held himself exempt from its rule, and of late it is declared threats had been made.

A settlement of the strike of the machinists of the Colorado Fuel & Iron Co., at Pueblo, was on a basis of 32½ cents per hour and ten hours for a day. The original demand of the machinists was for 37½ cents per hour.

The strike at the Baltimore Steel, Car & Foundry Co.'s works, Curtis Bay, has been ended. The company has agreed to give a bi-weekly payday, and has granted a nine-hour day to the molders. About 600 men were on a strike.

Two hundred machinists working in four shops in Marinette and Menominee have gone on a strike demanding a nine-hour day and an increase in wages.

Forty-six molders employed by the Poole Engineering & Machine Co., Baltimore, have gone on a strike for a reduction in their hours of labor. The men have been getting from $2.75 to $3.00 per day, which is in excess of the union scale.

Sam Parks, the pugilistic walking delegate of New York, has been convicted of assault on Peter O'Neill a delegate of the Plasterers' union. Parks was angry at O'Neill because the latter signed the employers' plan of arbitration so that the plasterers could return to work. Parks opposes the agreement which abolishes the position of walking delegate. On the same night Parks assaulted Charles Lawson, a member of the Housesmiths' and Bridgemen's union.

Arrested for assaulting a special officer of the Illinois Manufacturers' Association, William Stevens, business agent of the Metal Polishers' union of Chicago, was identified as an ex-convict and hold-up man. Stevens has been out of prison but a short time, and has been one of the most active pickets engaged in creating trouble about the plant of the Kellogg Switchboard & Supply Co.

The Mobile & Ohio Railroad has come to an agreement with its machinists, whose wages are increased from 30 cents an hour to 32 cents, 10 hours to constitute a day's work.

Fifty molders employed in the Clarage Foundry, Kalamazoo, Mich., have gone on a strike to secure recognition of the union and a minimum wage scale of $2.50 a day.

The strike at the plant of the Buffalo Union Furnace Co. is in statu quo. The men pretended on Aug. 8 that they were ready to return to work. When admitted to the yard, they did little work except with their jaws, and persuaded about one hundred men who were at work to quit with them. The stacks are now blown out.

At Youngstown, Aug. 10, the molders' union refused the proposition which the foundrymen offered, which is practically the Pittsburg scale, with the exception of the straight 10 cents increase for each man. The union objects to the introduction of molding machines. The foundrymen agreed to pay the $3 minimum.

A strike of the sheet mill workers of the Stark Rolling Mill Co., Canton, O., has been declared. The management of the company claims that it signed the Amalgamated Association scale under a misapprehension and that the provisions of the agreement are not what they supposed them to be.

The strike of the electrical workers and cranemen employed at the plant of the Pennsylvania Engineering Co., New Castle, Pa., has spread, the machinists and boiler makers having gone on a sympathy strike in the past week. The strike was originally declared on account of the refusal of the company to sign the scale as presented by the electrical workers.

The strike of the Amalgamated Association declared at the plant of the Ashland Sheet Mill Co., Ashland, Ky., continues and the mill is idle. No conferences have been held recently looking towards a settlement.

The lockout declared by the Builders' Exchange League, of Pittsburg, Pa., about ten days ago has been declared off, all the men returning to work this week. The differences existing between the league and the Building Trades Council are to be arbitrated.

A petition has been filed in the United States district court at Baltimore to have the Blue Mountain Iron & Steel Co. declared bankrupt. The petition was filed on behalf of the McLanahan Stone Co., a creditor to the extent of $2,500. The assets of the company consist of about 11,000 acres of land.

The drafting department of the Lloyd Booth plant of the United Engineering & Foundry Co., Youngstown, will be discontinued Sept. 1 and move to Pittsburg. All work in connection with the Youngstown plant will hereafter be done in the offices at Pittsburg.

FACTORY AND WAREHOUSE ARCHITECTURE.

A. K. ADLER.

I.—General Planning.

The first essential to the proper conception of factory needs is a deep and thorough understanding of manufacturing processes. A factory designer must have a working knowledge, not only of machinery in general, but also of that larger machine, the factory in its entirety which takes in raw material and delivers the finished product in a manner similar to each machine on its floors. Each step in the process is a component part of the mechanism which the architect is called upon to design. It is axiomatic that the first requirement in the design of a prospective manufacturing plant is an intimate knowledge on the part of the designer of the entire process which he is called upon to house and articulate. He must know the purpose and method of operation of each machine, the floor space required to operate it and the weight of the machine proper and the material around it. The various steps in the process calling for bench and hand work are equally important. After having mastered each step and the relation of each step to all the others, the architect is prepared to commence on the preliminary layouts.

The first step is to determine the floor space required in each department, the principal factors being, *first*, The floor space required for the most efficient operation of each machine; *second*, Aisles and runways; *third*, Space required for the temporary piling or racking of stock as it accumulates during accidental stoppage of parts of the machinery, and *fourth*, A percentage allowed for expansion, which varies according to the nature of the business. I have had one instance in my practice of a tripling of the proposed output before the work was well under way, but it is usually unnecessary to provide for more than 25 percent increase in output without additional building.

The next step is to determine upon the type of building required to meet the above conditions combined with questions of power transmission, lighting, handling of material and loading of floors. In laying out the path of the material through the shop it is essential that the work progress without doubling back on itself; going backward always makes confusion and in many branches of work it is very likely to result in great damage to the unfinished product, especially when part of the process is wet work. As a general rule, when the manufactured article or the machinery employed is heavy, unwieldy or bulky, a one story building is indicated, as it will be found that the cost of handling is enormously increased in such plants when it is necessary to elevate and lower the product during manufacture. The cost of elevating in such case is small, but the factor of labor in handling, delay in waiting for elevators, space required for storage, separation of departments and the tendency to cross paths are factors in the shop cost, leaving considerations of power transmission and lighting out of account. In wet work such as tanning and paper making, one story buildings always give the most satisfaction.

When the product and machinery are both light it is often economical to work in high buildings, especially if good elevator accommodations are provided. In such factories it is generally best to work the raw material upward from floor to floor, using the top floor as a stock room with an express elevator or dumb waiter, or better still, a continuously operating link belt conveyor to the shipping department.

Having determined the general layout of the building or buildings the next step is the machinery layout. It is absolutely essential that the final location of every machine be determined at this point. The principal factors to be considered are the leaving of sufficient room and no more for the most economical working of each machine; the arrangement of all machines of the same kind in a compact group, leaving sufficient room alongside each group for storage of material before and after working through the group. If this precaution be not taken, a condition of chaos begins whenever product is not disposed of ahead as fast as the departments behind produce it. It is also well to provide for a 25 percent increase in power, shafting, machine floor space, etc. Each group of machines should have an independent power supply running as close to the main source of power as possible. In almost every case electric transmission will be found the most economical and practical.

As far as possible each step of a manufacturing process should be housed in a separate room with brick walls if possible. Where the space required for a step is small, a number of groups may be united into one department but all work done in a room should be in the hands of one foreman who should have no other duty than that of being responsible for what goes on within the four walls of his department.

Rooms should be so laid out that work enters and leaves by separate doors and the material as it works through the room must travel ahead in such a way that there is no trucking in opposite directions over the same path.

Receiving and shipping rooms and rooms for sorting and storage of raw and finished stock are worthy of more careful study than is usually given to them. Plenty of room and light are absolutely essential for the detection of defects of material and workmanship. Ease in handling to and from cars or trucks is essential and much time and money may be saved by labor saving machinery properly designed for the work. The storage of material must be studied closely and proper racks, etc., provided so that the floor space may be occupied to the best advantage and the storage systematized for easy distribution and collection. When the factory product is heavy or bulky, it is essential that a separate building be provided for warehousing. In a woodworking plant recently designed by the writer, the factory proper occupies 300,000 feet of floor space and the storage and shipping departments occupy 140,000 square feet, or almost 50 per cent. This, however, is extraordinary as the output of the plant consists of special orders made up of stock sections of different sizes which necessitate the carrying of a huge stock to facilitate prompt shipments, no matter what the order is. Where the product of a factory is sold before manufacturing begins, only enough storage need be provided to take care of each order until it is complete and ready for shipment. Shop costs are greatly reduced if shipping and receiving can be carried on directly to the railroad. It enables the manufacturer to more easily buy and sell in car load lots and makes prompt shipments easier. A side track very often turns the tide from a losing business to a very profitable one.

It is only after the foregoing factors have been reduced to their simplest terms that it becomes possible to proceed with the working drawings of a factory building. The site of a factory should be governed by ability to get an abundance of labor as to neighborhood, but its exact location should be governed entirely by the foregoing considerations. Considering shop cost, which makes interest on cost of ground insignificant, all the above reqirements must be met in order to manufacture at such prices as to undersell competitors. Questions of power production and transmission, elevator service, light and heating are equally important and will be discussed hereafter.

The ground having been selected, it then remains to so group the different departments laid out provisionally, either as one story adjacent rooms or occupying the floors of a high building, as to make a compact unit without waste space and with proper light for each part of the whole. A casual inspection of existing plants will show that one square foot of well lighted, well arranged floor space is worth two feet of cut up, dark space. Light on all sides is the first requirement in good practice. A long, narrow or an L shaped building with elevators at the center is the best shape in most cases, excepting for one story buildings, where the different units may be packed together to occupy the least space and make the line of travel of product as short as possible.

Many manufacturers using high buildings, find it convenient to have a warehouse and stock building adjacent to the factory proper and connected with the main building by bridges at each floor. This is especially useful when the output of a factory is varied and it also reduces insurance on stock to a minimum.

II.—Construction.

It is taken for granted that the typical factory building is of slow burning construction. The difficulty of attaching machinery and shafting to fire-proof work and of making alterations in the structure, also the tendency to vibration make fireproof factories unpopular even when first cost is not a con-

sideration. The question of insurance has been solved by the Factory Mutuals in which the cost of insurance is lower for properly built wood construction than is the rate for fireproof construction in the regular companies.

It has been my experience that foundations for this class of work are figured too light. During a long period of observation, I have seen much cracking and unequal settlement in factory and warehouse buildings, but I have never had the slightest trouble in my work when I have followed the following method: I allow 120 pounds per cubic foot for brickwork, 150 pounds for stone and concrete and 30 pounds for dead load per square foot of floor area. I then figure the actual live loading on all parts of the structure, which is usually a simple matter when the building has been laid out in accordance with the principles set forth in Part I. I then figure the foundation to carry from 3,000 to 4,500 pounds per square foot, depending upon the soil. If the usual custom of supposing that all the floors will not be fully loaded over any one part of the foundation is followed, there is always bound to be trouble, as I have never yet seen a building which was not overloaded from basement to roof in some particular part. It may often be expedient to "skin" columns, piers, etc., but in such cases it is doubly necessary to provide absolutely stable foundations as unequal settlement would further increase the strains toward which our limit of safety has already been crowded.

The walls of modern factories must contain a large percentage of window openings which impose the necessity of pier and curtain wall construction. In my practice I have found that owners prefer to have the pier jambs on the inside, as the recesses form convenient pockets for radiators or machines. The piers should be built with hard burned sewer brick laid in Portland cement mortar, thoroughly grouted, and may be figured to carry 14 tons per square foot, if reasonable allowance is made for live load. Where framing is built into the piers, they should be liberally corbelled so that the timber does not set more than four inches into the brickwork. A double hooked anchor plate is preferable to the anchor box formerly much used. In figuring the area of a pier it is important to deduct for window boxes and any other wooden parts built into the walls.

Window and door openings in brick walls should be crowned with steel or cast iron lintels. Many factory experts prefer the steel lintel built up of an I-beam, channel and angle, or of two angles and two channels. The writer has used both forms but for openings of eight feet or less, his preference is unqualifiedly for cast iron lintels, as by their use the window head can be set about eight inches higher, making a great increase in volume of light admitted, and they also lend themselves more readily to the reception and anchorage of joists, thus making a much stiffer building. Wherever possible, windows should be of wire glass set in metal frames with an automatic closing device in case of fire. A good metal frame lasts as long as a wood frame and wire glass costs less for repairs than the ordinary s. t. window glass, owing to the fact that even when cracked it does not require renewal. The corrugations of the glass give an illumination almost as good as the light given by patented prisms and also cuts off sunlight which is so annoying along south and west fronts.

Doors should be built of three thicknesses of matched dry stuff and tinned with lock seam terne plates. They should be hung on very heavy sheaves or hinges and should invariably be equipped with an electric or fusible link automatic closing device. In fire walls there should always be double doors.

Framing lumber should be 1 sound common, or better, long leaf yellow pine, square edged and sound. At present prices this will be found more economical than equivalent sections of white pine, excepting for points adjacent to the pineries.

In laying out framing, care should be taken to avoid waste of timber, which is sold in even lengths; therefore joists should wherever possible be set at four-foot centers and should be either 14, 16, 18, or 20 feet long, the most economical being 16 feet, everything considered, but it is best when the loads are not excessive to use 20-foot spans to reduce the number of posts. Similar rules apply to girders, except that it is usually inadvisable to increase the span beyond 16 feet. Careful calculation will show that for ordinary loads a 16-foot square panel requires the least framing per unit of area.

(Concluded next week.)

SOUTHERN CAR AND FOUNDRY LITIGATION.

Litigation over the receivership of the Southern Car & Foundry Co. is still in progress in the South. On petition filed in the United States court by Thomas G. Bush, one of the receivers, Judge Jones, of the United States court at Birmingham, issued an order for the company to turn over all of its books and accounts. Receiver Bush alleged that he had made a formal demand for the books and that the demand had been refused. Capt. J. M. Elliot, one of the co-receivers, has resigned. There are three federal courts that claim jurisdiction over the property and they have all appointed receivers.

At Chattanooga, Tenn., Aug. 10, in the Federal Court, all creditors of the Southern Car & Foundry Co. submitted an agreement, giving Judge Clark jurisdiction over the plants located in Tennessee and Alabama, and Judge Clark thereupon appointed T. G. Bush, of Birmingham, and Thomas A. Gillespie, of New Jersey, joint receivers, and authorized them to start all the plants in operation and pay off the creditors. It is stated that the company under this settlement will be able to pay all creditors in full.

President Thompson Interviewed.

President Thompson, of the Republic Iron & Steel Co., was interviewed in New York last Monday on present conditions in the iron business. He said in part:

"Some of the rumors circulated in the financial district in respect to the iron and steel industry are too ridiculous to warrant comment. The steel and iron industry is all right. It is true that business is not as brisk as a year ago, but there is nothing startling n this. The mills of the country have been running to the utmost of their capacities for three years, and a reaction is natural. Wall Street knows little about the iron and steel industry. Some of the people who are bearing the steel stocks would not know a billet from a block of wood. If stock market fluctuations were based on actual conditions the steel stocks would be selling higher than a year ago."

It is understood that the Elliott-Fisher Co., a consolidation of book typewriter concerns, contemplates the construction of a new plant somewhere in or near New York, probably Brooklyn. Of the $10,000,000 authorized capital it is announced that $4,500,000 7 percent non-cumulative preferred stock and $4,500,000 common stock have been issued in the acquirement of the manufacturing plants and other properties of the Elliott-Hatch Book Typewriter Co. and the Fisher Book Typewriter Co., and also all properties of the American Railway Typewriter Co., American Standard Typewriter Co., and Keystone Co. The consolidated company, it is said, owns between 150 and 200 patents. The officers of the company are: President, Hon. J. D. Cameron, Harrisburg, Pa.; first vice president, Grant B. Schley, New York, N. Y.; second vice president, M. J. Mandelbaum, Cleveland, O.; secretary and treasurer, E. H. Schley, New York; general manager, H. J. Halle, New York.

The Rochester & Pittsburg Coal & Iron Co. blew in its new stack at Falls Creek, near DuBois, Pa., on Monday, Aug. 10. The torch was applied to the furnace, which was christened "Adrian," by Mrs. Arthur G. Yates, wife of the president of the Buffalo, Rochester & Pittsburg Railroad. Lucius W. Robinson, president of the company, Julian Kennedy, designing and contracting engineer, and a number of company officials were present. The stack is 80 feet high and has a 20-foot bosh and its estimated capacity is 350 tons daily. Work on the furnace plant was commenced more than a year ago and but for delays occasioned in the receipt of material the stack would have been completed three months ago.

The National Foundry & Supply Co., Williamsport, Pa., recently incorporated, is just starting in the power transmission business, being an off-shoot of the Valley Iron Works, of that city. It has leased the shops of the old Lehman Machine Co., which was taken in by the American Wood Working Machine Co., since which time the plant has been idle. Equipment has been ordered.

LAKE SUPERIOR IRON MINES.

The Loon Lake Iron Co., Ltd., Sault Ste. Marie, Ont., is now operating what is known as the Breitung property, situated 25 miles from Soo, Ont., and is at present in a position to ship about 400 tons of hard Hematite Bessemer ore daily. It has a diamond drill on the property which has gone through a bed of ore, at present, to the depth of 136 feet, averaging about 52 percent in metallic iron. The company has contracted with the Algoma Steel Co. for ore output of this year. The company at the present time intends to mine the ore and contract with outside furnaces for same. Its building operations are completed to such an extent at the present time that it is prepared to mine and crush its ore so as to prepare it for the furnaces.

All the Silverman lands in the ne corner of T 59 R 14, except an 80 acres leased some two weeks ago, have now been optioned to explorers, and some of them will perhaps be explored this fall. The formation is narrow at that point and not enough work has ever been done to determine just what geological change takes place in the taconite near there, though it is recognized that some change does occur, and the opinion is general that it is unfavorable. These explorations, if carried far enough, may have an interesting and important result.

It has been reported, and published, that the average ore found in the new Baraboo district, Wisconsin, was about 35 percent iron. This is not correct, for much ore of a very high grade and several million tons of merchantable ore have been found on the Deering work at North Freedom. Others have found good ore some distance from the first discovery.

Armenia mine, Iron River, is to close for the present at the conclusion of some drill work underground now being undertaken. The mine has made no shipments for some time, but has been maintained open.

Riverton mine, Iron River, is now idle on account of the coming in of the shaft which has been undermined by the fall of the hanging wall. It was necessary to sink shafts there in the hanging wall, and the mine has been operated on the backfilling plan, but it has caved into the shafts somewhat. Sometime, Iron River, which flows above the mine, will have to be taken care of. At other Iron River mines there has been a suspension of part of the work, and the Oliver Iron Mining Co.'s explorations in that region have been largely stopped for the present, and many of its options have been abandoned.

The Boulder Mountain Iron Co. is working in the sw corner of section 31 T 59 R 18, northwest of Mountain Iron, with a hardened shot drill. The drill has been in taconite and indications are said to be good for the discovery of ore in more or less quantity.

A considerable body of excellent ore has been found in the se ¼ of the nw ¼ of section 25-58-17, adjoining Howe mine of the Republic Iron & Steel Co. It is still being explored and there may be several million tons in the deposit.

A find made some weeks ago in section 15 T 59 R 14 is proving larger than before, and may lead to a large deposit. One hole is down 50 feet in ore and ten pits are from 10 to 16 feet in ore, all of good quality. The find is two miles east of any railway communication, and can be reached only by the Duluth & Iron Range road. The ore is in a portion of the range that has not been considered of much account, and where previous explorations have found the ore body quite thin, and often not clean. For this reason there is more doubt as to the future importance of this find than if it were in a region of better reputation.

The LaBelle Iron Co. has shipped 20,000 tons from its mine in section 24 58-17, and has ceased for the present. But underground development work continues steadily. The mine may make a small additional shipment before the close of navigation. This is its only Lake Superior property now operated.

Republic Iron & Steel Co.'s shipments for the season to date have been: Republic group and Pettit, 80,000 tons; half Union mine, 25,000; Kinney, 15,000. From Negaunee mines about 50,000 tons. For the season this company's Mesabi mines will ship more than 225,000 tons, exclusive of about 50,000 from its half interest in Union.

Up to Aug. 1 the Fayal mine has shipped more than 900,000 tons, which would indicate a production for the season of more than 1,750,000 gross tons. It is expected, however, to close early, and unless new orders may be received late in the season the year's output will not be so much as above indicated. The company does not expect to mine much above 1,500,000 tons. No. 4 shaft is going down fast and some drifting into ore is commencing.

Biwabik mine has shipped to date 450,000 gross tons, and is forwarding about 6,500 tons a day. If the mine continues to the close of season, as now expected, it will make a total of 1,050,000 tons, and this is about the mark that has been set. The crusher and four shovels are all busy in ore at this time.

Pickands, Mather & Co. mines on the east end of the Mesabi have made shipment to date of 140,000 tons, this list including Sparta, Malta, Minorca, Elba, Corsica and Troy. The latter is a new property, shipping for the first month. Their two west Mesabi mines are commencing to ship in quantity, but have hardly made any figures yet.

Stephens mine, of the Oliver Iron Mining Co., in section 26 T 59 R 15, has shipped in the past month 45,000 tons. This was its first month and was a good record. About 200,000 tons will be its summer total.

The Mesabi Explorations Co. has been organized with $100,000 capital, to explore on the Mesabi range. Its incorporators are: H. Smith and E. Wenzel, Duluth, and F. B. Rossom, Virginia, Minn. The company owns some churn drills and will do its own work.

Idle Plants in Pittsburg and Valley Districts.

The number of idle mills in the Pittsburg and Valley districts was further increased this week by the shutting down of the Carnegie departments of the South Sharon, Pa., works, three mills at the Homestead plant of the Carnegie Steel Co. and all but a few of the hammers of the Howard Axle Works of the Carnegie Steel Co. At South Sharon the open-hearth, bloom and skelp mills have shut down for repairs while the blast furnace went out for relining. The old Buhl plant at Sharon is also out for repairs. At Homestead the 10-inch, 28-inch, 38-inch and converting mills are off for repairs. At Wheeling, W. Va., the Bessemer plant of the Wheeling Steel & Iron Co. is off, extensive repairs being made, and it is not known definitely when operations will be resumed. At Youngstown, O., the Bessemer plant of the Republic Iron & Steel Co. is idle, having been shut down July 1, for the installation of two 10-ton converters, but it is probable that the plant will be blowing steel before the end of the week, a trial blow already having been made. At New Castle, Pa., No. 3 stack of the Carnegie Steel Co. is being dismantled to make room for a modern stack, while No. 3 furnace of the Duquesne plant of the company, Duquesne, is out for repairs. At New Castle ten mills of the Shenango plant of the American Tin Plate Co. are idle, although the remaining twenty mills are being operated in full. The Jones & Laughlin Steel Co., Pittsburg, expects to make extensive repairs to one of its blooming mills at the South Side works and the mill will be off within the next week or ten days. The continuous bar mills of the Carnegie Steel Co., located at Duquesne, and those of the Jones & Laughlin Steel Co. are not operating in full, while the output of the structural mills of both companies has been curtailed.

On Aug. 6 a meeting was held in Baltimore for the purpose of organizing a metal trades association in that city. The meeting was arranged for by Mr. Chas. Pusey, formerly of Pusey & Jones, of Wilmington, Del., who is now local district organizer of the National Metal Trades Association. Mr. John B. Adt, of the John B. Adt Mfg. Co., presided. Mr. E. F. DuBrul addressed the meeting. There were present representatives of all of the largest concerns and the result of the meeting was an organization of the employers of the metal trades in Baltimore.

The Hustead-Seamans Coal & Coke Co., of Uniontown, Pa., has been incorporated with $500,000 capital for the purpose of engaging in the mining of coal and the manufacture of coke. The incorporators of the company are: J. M. Hustead, I. W. Seamans, A. M. Hustead, F. M. Seamans, Jr., J. E. Hustead and W. B. Beeson.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

I am glad to see the article on the surface speeds of milling machines printed in *The Iron Trade Review* of Aug. 6. It is interesting because the prominence of the shop where the table is in use gives weight to the figures. I am not so sure, however, that the matter is altogether satisfactory from a shop point of view. The figures tell too much and too little. The subject is the old story of chain strength over again and the limit of capacity is found at the weakest link. And the weak point in milling may be in the quality and temper of the cutter or the lack of rigidity in the machine, and as far as possibilities go there may be a combination of faults in the one miller. Here comes in the matter of skill. A knowledge of the working range of expensive cutters in metals of varying degrees of hardness is better than any table. It is doubtful if ever it is really worth the while that any other than a workman of that grade should have the setting of milling speeds and feeds. So much depends upon the peculiar circumstances that only in a general way does it seem to be possible to apply tables of this kind in shop practice.

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I must admit that there are many who hold other opinions. Men who believe that rules are better than any trust in the workman pushing his machine near the limit of production and that in any case a milling cutter is too expensive an item to be run near a margin of destruction on the one hand, or at a feeble gait on the other. The table of speeds is then intended as a guide toward the joint economy of cutters and time. So far as that goes, the three speeds suggested in the article are easily remembered: 20 feet per minute for steel, 40 feet per minute for cast iron, and 60 feet per minute for brass. They seem to me rather low as standards go, but then so much depends upon other things that the difference may not be as great as it appears. I must confess that a good many of these figures set forth as standards are rather puzzling from my point of view. The width of cutter and depth of cut are important factors certainly, but these do not seem to be considered. It is obvious that with twice the width of face, the other conditions being equal to the occasion, double the amount of material will be cut away. It does not seem so much a question of lineal feet as of square measure.

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I was once impressed with the probable advantage of having cutting speeds definitely assigned to cutters. I had seen some gear cutters used with so much tenderness in one shop and so little consideration in another that there seemed a good opening for a suggestion that would make for the happy medium. Why not stamp on the cutter the suitable speed for that size? Just three sets of figures with a hyphen between them to indicate the turns per minute for steel, cast iron or brass. The same thing could apply to milling cutters generally. There is an amount of variety in all this work which does not seem to combine easily with any hard and fast rules. On that account I suppose the suggestion would be like other rules, of little consequence to the experienced or the careless, as the case may be. There is no objection that I can see in having the tool maker approve the merit of his own work by stamping on it just what it will do, and the cutter has then for reference something of a working standard.

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The speeds given in the article are not excessive and I have been under the impression that machinery manufacturers were keyed up to a much higher rate. I noted some years ago the following, which was said to be good practice: Let n = the number of revolutions and d the diameter of the cutter in inches, then for steel, $n = 138 \div d$; for wrought iron, $n = 183 \div d$; for cast iron, $n = 229 \div d$, and for brass, $n = 458 \div d$. These figures are sufficiently different from those given in the table to prompt any number of inquiries in regard to cutting with lubricant or dry, character of finish and accuracy, and so forth, by way of reconciling the results. The subject is as difficult to harmonize up to the measure of any set rule as would be the comparison between the process of milling planer gears and the rough and ready specimens of dentistry which are harnessed to street car motors. Every rule or table is nevertheless useful as it is understood and its working limits defined. Even the rule of thumb has advantages when, as has often been suggested, the user has a good thumb.

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I recently sent in a few examples of the hot weather progress of engineering as marked by the daily press record of invention. Of course I do not see it all, and the following item, borrowed from the *Electrical World and Engineer*, adds another to the list: The place of honor in the sensational section of the *New York Herald* of last Sunday is given to an article which presents the claim of Rudolph M. Hunter, of Philadelphia, that he has solved the problem of the alchemists, and will soon begin the manufacture of gold on a large scale, with a "yearly profit on the plant" of 57,000 percent. Two views of Mr. Hunter are included, and one of a massive machine, towering many feet above a workman, who appears to be polishing a moving belt with a smoothing iron. "To forestall the inevitable smile of incredulity and insure a serious hearing," the writer of the article introduces Mr. Hunter as "the original inventor and patentee of the alternating-transforming system of electrical transmission, trolley, conduit and electrical accumulator systems of electric railways, the series multiple controller, electric brakes, electric car heating, etc." In an interview Mr. Hunter says Prof. E. J. Houston has made the statement, "Gold can be made if the split atoms of electrons can be separated and re-collected," and then adds, "I have made and am making it by this breaking asunder of the atoms of electrons." At the conclusion of the interview, Mr. Hunter says that for some time he debated if he should merely convert the gold privately for himself, but finally concluded $500,000 capital is necessary. In a tabulation of figures he then shows a net profit of $16,159,500 on this investment, and adds, "I stake my scientific reputation upon the correctness of these figures."

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Another genius is given attention in one of the newspapers because he has designs on the noise which now goes sadly to waste in our large cities. By some up-to-date Keeleyism he proposes to put this misspent energy to use and instead of the racket tearing holes in the atmosphere we are to direct the force into other and mechanical channels. There is probably something in this scheme. Many machines are known to work much better after considerable noise has been made over their faults. The lubricating forcefulness of shop profanity would disappear if the noise were taken out of it. Much of it goes ill directed and any scheme which will focus a lot of this fruitless effort right down on the job is to be encouraged. Let the man who wants to corral the noise of the street, our neighbors' mechanical music or the expletives of the shop, have the right of way and all the rope he needs.

Obituary.

Robert Atherton, president of the Atherton Machine Co., who since 1848 had been identified with the manufacture of textile machinery, died from heart trouble at Paterson, N. J., Aug. 5. He was born in Westchester County, N. Y., in 1832.

E. J. Aulls, a well-known foundryman at Bath, N. Y., was drowned in Lake Keuka Aug. 4.

William E. Dodge, a well known business man and philanthropist of New York City, died Aug. 9 at Bar Harbor, Maine, aged 71. He was a member of the firm of Phelps, Dodge & Co., importers of metals. He was president of the Ansonia Clock Co., vice president and director of the Copper Queen Consolidated Mining Co., and director in the American Brass Co., Commercial Mining Co., Detroit Copper Mining Co., El Paso & Southwestern Railroad Co., Lackawanna Steel Co., and other companies.

The plant of the Keystone Foundry Co., Uniontown, Pa., operated by C. W. Howell and Robert McDowell, has passed into the hands of the sheriff on an execution of M. Streng Sons, Ltd., Pittsburg, Pa., for over $7,000.

REPORT OF THE REPUBLIC IRON & STEEL CO.

Net earnings of the Republic Iron & Steel Co. for the six months ended June 30 were $1,356,777 after allowing $674,835 for improvements and depreciation. The surplus after the payment of the preferred dividend was $642,185, making the total surplus after preferred dividends for the year $1,313,817. This amount figures 4.8 percent on the common stock, as against 3 percent earned on the common in the preceding fiscal year.

Following is a statement of the earnings of the company for the six months ended June 30 and a comparison of the earnings for the fiscal year ended the same day with those of the preceding fiscal year:

	Six mos. to June 30, 1903.	Fiscal yr. to June 30, 1903.	Fiscal yr. to June 30, 1902.
Profits after expenses, except renewals and repairs	$2,031,612	$4,123,500	$3,260,076
Less improvements, repairs and depreciation	674,845	1,382,600	1,011,244
Net profits	$1,356,777	$2,740,900	$2,248,832
Dividend on preferred stock	714,591	1,427,083	1,424,108
Surplus	$ 642,185	$1,313,817	$ 824,723
Previous surplus	2,606,020	1,934,389	1,109,665
Total surplus	$3,248,206	$3,248,206	$1,934,389

Following is a comparison of the balance sheets as of June 30, this year, and the corresponding day in 1902:

ASSETS.

	June 30, 1903.	June 30, 1902.
Real estate, plants, buildings, machinery and other permanent investments	$40,708,480	$41,411,333
New construction	6,066,603	4,385,563
Stocks in sundry companies at cost	486,318	162,200
Producing oil and gas wells, pipe lines, leases.	144,359	.....
Prepaid royalties on ore and coal, and prepaid insurance	301,957	322,424
Inventories of raw and finished materials	4,614,739	3,046,650
Accounts and bills receivable	3,379,615	3,359,216
Cash	857,495	1,125,185
Total	$56,559,569	$53,812,571

LIABILITIES.

Capital stock issued—		
Preferred	$20,852,000	$20,852,000
Less in treasury	435,100	495,100
Outstanding	$20,416,900	$20,356,900
Common	27,352,000	27,352,000
Less in treasury	161,000	161,000
Outstanding	$27,191,000	$27,191,000
Total stock out	$47,607,900	$47,547,900
Accounts and bills payable	4,931,556	3,636,323
Preference div. (since paid)	357,295	356,245
Reserve for depreciation of ore and coal mines.	201,331	.....
Reserve for taxes and insurance	144,378	120,380
Reserve for possible loss in collection of outstanding accounts and bills receivable	68,901	69,334
Deferred payments on coal lands	.....	148,000
Surplus	3,248,206	1,934,389
Total	$56,559,569	$53,812,571

In his statement to the stockholders A. W. Thompson, president of the company, said in part:

"The extensive new work done in the Birmingham district, together with the cost of the new steel plant, and of the new continuous mills at Youngstown; of additional coke ovens; of the acquisition and development of ore and coal properties; of extraordinary replacements of rolling mills and blast furnaces, etc., consumed the sum of $6,066,602.97, shown in the balance sheet as disbursed for 'new construction' during the last four years. Of this amount almost two million dollars ($1,918,325.19) have been expended in the Birmingham district alone for the erection of our new No. 3 Pioneer furnace and of coke ovens, for the opening of ore and coal mines, for several hundred new houses, for locomotives, railroad tracks, switches, etc. The wisdom of this investment is shown by the fact that the net profits derived from the Birmingham district exceed the total amount there expended for new construction. The new (No. 3) blast furnace produced during the year last past (July 1, 1902-July 1, 1903) 80,202 tons of pig iron, almost equal to the combined product of Pioneer furnaces Nos. 1 and 2 and at much lower cost. Pioneer furnace No. 2 was blown out April 1, in order to increase its capacity up to that of No. 3. This work is now completed, and, during the next few months, Pioneer furnace No. 1 will undergo the same change. All of the Northern furnaces have been very recently relined and are good for continuous operation for from two to three years.

"Our holdings of raw material have again received substantial additions during this fiscal period. Under a favorable lease we have added 1,000,000 tons of desirable ore, and through one of our subsidiary companies (the Connellsville Coke Company, the entire capital stock of which is owned by this company) 1,200 acres of additional coking coal were acquired on favorable terms. Starting out with a Northern ore supply of only 2,500,000 tons and with a coal supply of only 1,500,000 tons—barely sufficient for the operation of our Northern blast furnaces for five years—the company now commands a supply of over 20,000,000 tons of the best grades of Northern ore and of 14,000,000 tons of Connellsville coking coal, sufficient for the requirements of our Northern blast furnaces, producing 1,000 tons of pig iron per day, for a period of thirty-five years. A large proportion of these ore properties are held in fee, and the remainder under very favorable leases, or under term contracts, and we are now mining all our requirements. They are all maintained in excellent physical condition and are equipped with the latest improved mining machinery. In addition to the coking coal the company owns in fee 1,868 acres of steam coal in the Pittsburg district, sufficient to supply our works in the Valley district with steam coal for at least forty years. In Alabama the company mines all its coal, ore and limestone, owning a sufficient acreage of ore and coal lands and of limestone, almost entirely in fee, to cover the requirements of our Southern furnaces and mills for more than fifty years, and it manufactures all of its coke from a battery of 910 ovens, located at its furnaces. Being so amply provided with raw materials further expenditures in this direction appear to be unnecessary for a long time."

U. S. Steel Corporation's Railroads.

A director of the United States Steel Corporation says: "The standard guage railroads owned by the steel corporation are becoming more valuable to the corporation every season through the scheme of improvements, which increases their earning power materially. Last year the ordinary maintenance of the rail properties cost $3,544,654, and $607,967 was expended in extraordinary replacements, making a total of $4,152,622. In return for this outlay the corporation got all its lines in excellent repair, and this year is transporting its raw materials and finished products, in many instances, wholly over its own tracks, thus saving heavy freight charges. The steel corporation now has 764 miles of main line, 259 miles of branch lines, 178 miles operated under trackage rights, 140 miles of second tracks, and 470 miles of sidings, making a total of over 1,800 miles it is utilizing at the most important points. The net results of its rail ownership are impossible to figure out, but the property includes some very valuable terminals, and what is really an outer belt line around Chicago, thus giving it direct connections with every railroad entering Chicago. I should estimate the value to the corporation of the various railway lines it owns or leases at not less than $60,000,000, taking into consideration what rights of way, trackage, and terminals are worth, and I should consider its earning capacity clear of all charges at 10 percent of this. Included in the system are 470 locomotives and 26,164 cars, of which there are 2,300 gondola steel cars, 4,364 iron ore steel cars, and 6,500 ordinary iron ore cars."

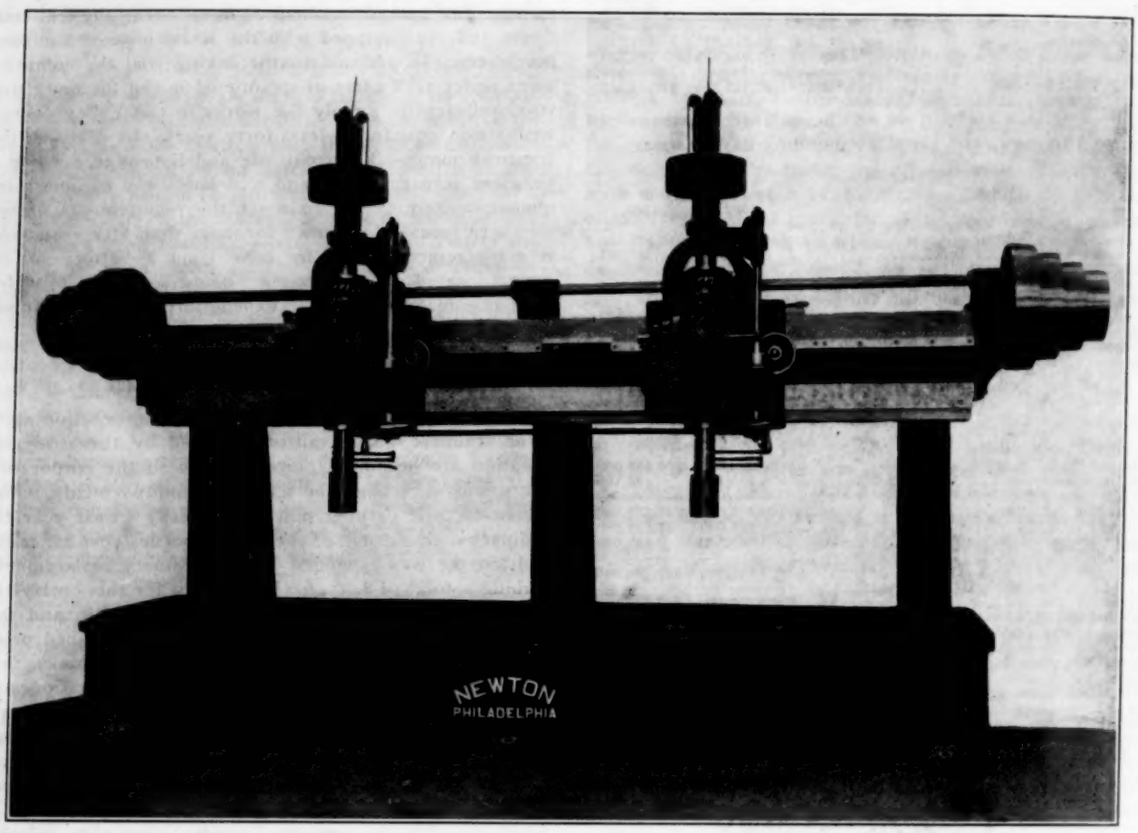
With final shipment to Philadelphia a few days ago the American Bridge Co. completed an order for 125,000 tons of steel to be used in the construction of the greatest freight viaduct in the world. The frame work is more than a mile in length. It is part of the Pennsylvania Railroad system, and is the overhead section of a service from Girard Ave., near Fairmount Park, in the Quaker City, down towards Gray's Ferry, below South St. More than $750,000 is involved in the contract. Beneath the viaduct is a surface line of tracks, and underground extension, all covering the same distance.

A NEW DUPLEX BORING MACHINE.

This machine has been designed for boring both ends of locomotive rods at the one time and to meet the modern requirements demanded in rapid work on heavy rods. Each head is driven and fed independently with two countershafts or the machine can be made with electric drive and to use two motors.

The center distance of the spindles is capable of a variation on the rail of from 39 inches up to 11 feet 9 inches, the spindles are 4 inches diameter and have four changes of positive feed. The maximum distance between the end of spindles and the work table is 26 inches. The work table of the machine is made in the form of a pan for catching the drippings and the rail of the machine acts as a reservoir for the return of the lubricant after being drained from the table.

The spindles are driven with steep lead phosphor bronze worm wheels and hardened steel worms ensuring a steady motion of the cutting tools. The machine weighs about 25,000 pounds and is made by the Newton Machine Tool Works, Philadelphia.



A NEW DUPLEX, ROD-BORING MACHINE.

The report of the directors of the Alamo Mfg. Co., of Hillsdale, Mich., made to the stockholders at the annual meeting held a few days ago was a favorable one. At the annual meeting a year ago the capital was increased from $25,000 to $75,000, and at the meeting held February last the stockholders unanimously voted to increase the capital from $75,000 to $150,000, making a total of $125,000, added to the working capital in one year, all of which was subscribed by the original stockholders. The equipment and buildings now represent an expenditure of upwards of $100,000, an increase of $75,000 within the past year. The following directors were re-elected: A. D. Stock, Dr. W. H. Sawyer, C. H. Rittenhouse, F. M. Stewart and E. T. Prideaux.

The Wyman & Gordon Drop Forge Co., of Worcester, Mass., has purchased a site in Cleveland, and will establish a branch plant.

MERCHANT IRON DEPARTMENT OF MINNEQUA WORKS.

BY J. B. MONAHAN, SUPERINTENDENT.

The Merchant Iron Department of the Minnequa Works of the Colorado Fuel & Iron Co. at Pueblo is made up of a twenty-inch bar mill, a twelve-inch mill, a nine-inch guide mill and a spike factory. Approximately 275 men are employed in the entire department.

The Twenty-Inch Mill.

The twenty-inch mill is used or rolling heavy bar and for making fagot bar, billets and slabs to be worked over on this and the other mills. It has two three-door gas furnaces, each having a capacity of 15,000 pounds of steel or 9,000 pounds of iron to a heat. Twelve heats constitute a turn on this mill, and two turns are worked in twenty-four hours. The bars worked here range in size from flats 8x2 inches to 2x¾ inches; rounds from 4½ inches to 1⅝ inches; squares from 4 inches to 1½ inches; angles, 3½, 3 and 2½ inches (equal legs only); also, angle splices and wagon sections of various sizes.

The Twelve-Inch Mill.

The twelve-inch mill is used as a bar mill and as a guide mill also. Sizes too heavy for the nine-inch mill and too light to be rolled to advantage in the twenty-inch mill are worked very successfully here. Nearly all the steel mine rails are made on this mill. They run eight pounds, ten pounds, twelve pounds, sixteen pounds and twenty pounds to the yard, and are re-rolled from old steel rails of large section and from 4x4-inch billets. The sizes usually rolled are 4-inch to 1⅜-inch flats and 2-inch to ½-inch rounds and squares. More special shapes are made here than on the 20-inch mill, owing to greater speed and ease of changing rolls. This mill has three three-door coal furnaces, only two being used at one time. Two of these furnaces are equipped with Cahall waste-heat boilers.

The Nine-Inch Mill.

The nine-inch mill is especially adapted to light work which requires little draft on the rolls and great speed. It

has one four-door gas furnace. The nine-inch mill has the largest range of sizes and shapes of any of the mills. The sizes rolled are from 2½x¼-inch to ⅜-inch. No. 14 gauge flats (No. 14 gauge is considerably less than ⅛ of an inch), and ¾ to ¼-inch rounds and squares, and many special shapes, such as angles, channels, half rounds, ovals, half ovals, screen bars, splices, wagon steel and many others.

The Spike Factory.

The spike factory includes three Vandegrift automatic machines—each with a capacity of 100 kegs of standard track spikes every twelve hours—and five hand-feed machines, for making various sizes of track, boat and bridge spikes, the capacity of which varies, of course, with the character of the output. The spike factory is now housed in a temporary wooden building which is being replaced by a steel structure.

The Process of Rolling Merchant Iron.

The process of making merchant iron is the same on all the mills, differing only in the size of the piles and weight of the finished bars.

In the first place wrought-iron scrap is piled by hand into a compact mass called a fagot and bound together with wire and pieces of bar. A number of these fagots are placed in the furnace and heated to a welding heat. They are then carried to the rolls by long tongs, suspended from overhead, and are passed through several grooves in the rolls, each groove smaller than the last, until reduced to the proper size. The enormous pressure brought to bear on the fagot during the first few passes through the rolls, called "roughing passes," welds all the particles of iron firmly together and makes a billet or a fagot bar. The difference between a billet and a fagot bar is one of form only, a billet being square in section, while a fagot bar is flat. A very thick bar is called a "slab" and is used for re-rolling into a very thin finished bar.

After the fagots have been rolled into billets they are simply sheared to proper length, reheated and rolled into finished iron by the same process that made them billets. If heavier iron is to be made, fagot bar is used. The bar is sheared to proper length and the pieces are laid one upon another until the pile is just about as high as it is wide. These piles are then placed in a furnace, heated again to a welding heat, and the same process as before makes finished iron. The second rolling lengthens the grain of the iron, removes all scabs and other defects, and makes a smooth, marketable piece of iron.

Steel requires but one working in the Merchant Department, as it comes from the steel department in the form of blooms, billets and slabs. It is treated the same as iron is after the first working.

When the iron or steel has gone through the rolls for the last time, and is reduced to the proper size and shape, it must be cut to length. The smaller sizes are sheared by powerful, electric, alligator shears, and the larger sizes are sawed, while red-hot, with a saw driven at high speed by an electric motor. Owing to the fact that iron contracts greatly while cooling, it is impossible to cut it to exact lengths while hot; therefore, if exact lengths are desired, the bar is allowed to become cold and is then cut to exact lengths on another machine called a "cold saw."

The bar is now a finished product and is ready for the warehouse, where it is weighed, inspected for possible flaws and put into stock or loaded directly into freight cars.

Advantages of the Mills Now in Operation at Minnequa Over Those of Newer Type.

For certain kinds of work the improved styles of mills, such as continuous and Belgian mills, are taking the place of the old-style mills; but for jobbing work, such as is done here, the present type of mill more than holds its own.

In order to work to advantage the new mills must work for days or weeks on one size, as a great deal of time is required to change rolls, guides and fixings, and this repeated even once in two or three days would make a material difference in the mill's output. On the other hand, a complete change of rolls and guides, such as is required in changing from rounds or flats to re-rolled rails, can be made in less than an hour in the mills now in use. As many as fifteen sizes have been made in one twelve-hour turn on one of the mills without reducing the output very materially.

The tonnage of the new mills is much greater, but they are not adapted to so large a range of sizes and shapes.—[Camp and Plant.

Steel at the World's Fair.

James Gayley, first vice-president of the United States Steel Corporation, has been selected as a member of the St. Louis World's Fair iron and steel committee, to cooperate with the World's Fair officials in arranging for a large and satisfactory representation of the iron and steel industry of the United States at St. Louis next year. The United States Steel Corporation's exhibit will occupy the central portion of the building, and will illustrate through a series of models and through actual equipment, the various methods for the manufacture of iron and steel. Independent steel companies are also arranging for exhibits which will show the finished products, the raw materials and the amount of iron ore, limestone and coke necessary in the manufacture.

Mr. W. F. Stimpson, inventor of the computing scale, has recently organized a strong company known as the Stimpson Standard Scale Co., at Detroit, and has completed a plant at Milan, Mich., to manufacture wagon, platform, beam and truck scales. The building is a large two-story brick structure, modern in every particular, with complete outfit of machinery. Mr. Stimpson is president of the company. He is a well known scale man, having organized the Stimpson Computing Scale Co., of Elkhart, Ind., and the W. F. Stimpson Co., Detroit, Mich., both of which companies operate solely under his patents. Both companies have been successful. The intention of the company is to manufacture high-grade goods. The general offices are located at the corner of Randolph and Congress Sts., where is also carried a large stock of scales, grocers' and butchers' supplies, and repair work is done. O. R. Baldwin, formerly secretary and manager for the American Harrow Co., of Detroit, is one of the large stockholders and general manager. Jas. J. Lannen, formerly manager for the M. N. Rowley Scale Co., is a stockholder and one of the directors and secretary for the company, and has charge of the retail department.

Some interesting experiments have been made by Herr Scholter, manager of the Nuremberg-Furth Tramways, to ascertain the resistance of flywheels. The experiments were made on the flywheels of two horizontal, tandem compound engines developing 450 h. p. at a speed of 95 revolutions per minute. The arms of each of the flywheels are formed of a double T with a central web set parallel to the center line of the shaft. The rotation of these flywheels was found to produce a strong current of air which seemed to indicate the existence of a considerable resistance, and it was decided to cover the two faces with a smooth protection of sheet metal. In order to determine the difference in the resistance under the two conditions, with and without the covering, one dynamo was made to serve as a motor to drive the unloaded engine. With the flywheel in its original condition, the work required was 13,300 watts, while, after the wheel was covered, only 9,874 watts were needed—a difference of 3,426 watts or about 5.7 h. p.—[Mechanical Engineer.

The Pennsylvania Railroad Co. has under construction in its shops at Altoona, Pa., an all-steel passenger car for use in its subway system in New York. It is 50 feet long and closely resembles other coaches of the company, except that there is not a particle of wood about it except the rattan seats.

Metallic Packings; Principles of Design Essential for Successful Development.

BY CHARLES LONGSTRETH.

Metallic packings attracted attention at a very early date in the history of the steam engine. Edmund Cartwright's patent of 1797 specifies the following:

The piston rod is also packed upon the same principle, that is to say, solely with metal which is thus done: The top of the cylinder being made true and smoth, a flat ring, cut into segments, lies upon it and embraces the piston

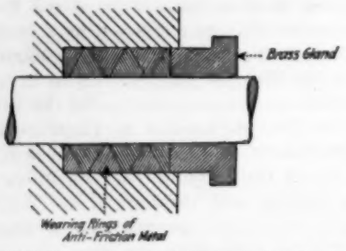


FIG. 1.—RIGID PACKING OF MALE AND FEMALE RING TYPE.

rod, towards which it is pressed inward by springs; this ring is inclosed by another divided into segments; and to which it is pressed inward by springs. The segments in the inner and outer ring must be so placed as to break joint. The rings are covered by a third, which is held down by any adequate pressure, as in the piston; the whole may be encircled by a box for holding oil, etc.

This covers the principal points of quite a number of this well-known packing of the segmental block type in use at the present time.

Also Richard Trevithick's patent of 1815 particularly alluded to a combination of fibrous and metallic packings. He also describes a design that is practically the basic principle of the present double packings, that is, two stuffing boxes with intervening space. At that early date he was impressed with the friction caused by the fibrous packings, and used his double packing with the idea that he could overcome some of this friction by allowing steam or water to occupy the space between the two packings.

John Barton's patent of 1816 and drawings which accompany it, plainly show a very ingenious segmental block packing, which would probably be considered a good one even at the present day.

From what we read of these early English patents, it is quite surprising that metallic packings were not more generally used at an earlier date. The only reason given for their disuse was probably the imperfect condition of piston rods which would not permit the use of any form of metallic packing, owing to the irregularity of surface which became more noticeable on account of the long strokes then in use.

Purposes and Requisites of a Satisfactory Packing.

The purposes of a piston-rod or valve-stem packing are to prevent leakages of steam both along the rod or stem, and also between and around the packing, and to do this with minimum pressure and friction. At the same time the packing should not be designed to act as a guide for the rod or stem, thus partly usurping the function of the crosshead guide. The packing, on the contrary, should be designed so that it will be sufficiently flexible to allow slight lateral movement of the rod while remaining steam-tight. It is to the satisfaction of this latter requisite that the more recent designs of metallic packing owe their superiority over the old-fashioned fibrous or the early designs of metallic packing.

Character of Packing Dependent Upon Nature of Motion of Working Parts.

In designing packing, we must consider the character of the rods or stems to be packed—that is, whether the moving parts have a rotary or reciprocating motion. If the moving parts require no guiding, as in the ordinary type of steam pumps, the problem is a comparatively simple one. If the moving part has a slight vibratory as well as a reciprocating motion, then the problem becomes quite difficult to solve. This vibratory motion, being caused by the slight difference in diameter between the piston and cylinder, as well as by the play between chosshead and guide, changes at every point of the stroke and varies with every position of the connecting rod. Slight vibratory motion may also be caused by the roll or pitch of the vessel, in the case of marine engines, and while the amount of such motion may seem trivial to some, it bears a very important relation to the wear of both packings and rods.

Character of Packings; Rigid vs. Flexible.

In order properly to classify packings to meet the varying conditions to which they are subjected we should divide them into two general classes: (a) Rigid packings of the male and female ring order. (b) Flexible packings, which can again be subdivided into two types—the segmental or block design and the conical-ring form.

Rigid Packings.—This design is illustrated by Fig. 1. It prevents the leakage of steam around the stuffing box, by having the outside of the female rings pressed against the stuffing-box wall. In order to prevent the leakage of steam along the rod, the inside of the male rings is pressed toward the rod. The force holding these rings against the various surfaces is exerted by pressing the gland against the end of the rings. As ordinarily designed, it will be observed that the great trouble with such packings is to secure a steam-tight joint against the wall of the stuffing box, as there is no wear there. This can only be accomplished by producing great friction and pressure against the rod, and as the packing fills the entire space between the walls of the stuffing box and the rod, it does not allow any of the vibratory motion previously alluded to.

Where vibratory motion exists and this class of packing is used, the packing is compelled to do a large amount of the guiding that should be taken up by the walls of the cylinder and the guides. The absurdity of attempting to do this part of the work with a surface so small and a material so soft as that of the packing will be at once apparent to the engineer. It can readily be seen why piston rods fitted with this type of packing require such an excessive amount of lubrication to prevent the rods from running hot. Frequently with packings of this type, rods become so hot as to melt the anti-friction metal and cause it to run from the stuffing box. This packing, therefore, can only be used with success on valve stems and rods of auxiliaries, as well as on appurtenances to boilers and engines.

It is possible, however, to design this packing so that the amount of pressure against the rod may not only be

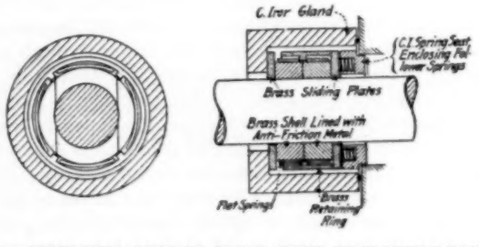

C. Iron Gland
C.I. Spring Seat Enclosing Pal Inner Springs
Brass Sliding Plates
Brass Shell Lined with Anti-Friction Metal
Flat Springs
Brass Retaining Ring

FIG. 2.—SEGMENTAL RING OR BLOCK FORM OF FLEXIBLE PACKING.

reduced, but at the same time the leakage around the wall of the stuffing box may be stopped. It goes without saying that this packing may be used where the motion of the rod or stem is comparatively small or infrequent.

It is usual in most cases to place one turn of fibrous packing under the gland; often it is claimed that this turn of soft packing is for lubricating purposes, but as a matter of fact the manufacturer of the class of packings under consideration knows that it is really there to prevent the slight leakage of steam due to improper design of packing. Some properly-designed packings of this char-

acter may be used with a turn of soft packing while they are being broken in. After the metallic packing has worn down to a bearing the soft turn may be removed, since the metallic packing will be found to be steam tight. Packings of this design are of very early origin, the first of them being used about 1843.

Flexible Packings.—The succeeding types of packings, which may be considered as designed on engineering principles, differ entirely from the foregoing. The new designs do not attempt to fill the entire stuffing box, as steam is allowed to enter the stuffing box and the packings thus have a chance freely to acquire a vibratory motion. The steam leakage around the walls of the stuffing box is duly taken care of by metal or other gaskets under glands, and by sliding faces ground steam tight. The gland is thus pulled up tightly against the intervening joint and the cylinder head, and all the adjustment takes place from the inside.

The segmental ring or block form of flexible packing is shown by Fig. 2. These packings are usually metallic segments, although it is often the case that they are simply blocks of metal held fairly close to the rod by some form of pressure—that is, either by means of a spring, by the pressure exerted by the steam, or by a combination of both these forces.

There are probably more different designs of this class of packing than of any other, since such forms may be designed by people of comparatively little experience, and give fairly good satisfaction where moderate steam pressures are used.

Those in charge of marine machinery should be impressed with the fact that the quality of the steam supplied to the engines will have a very important influence upon the life of the packing. There is no doubt that even a slight amount of water in suspension in the steam brings with it from the boiler some gritty substance. While this amount may be apparently of an inconsiderable nature, it is sufficient to greatly increase the wear of the packing.

The relative life of the packing when using both dry and saturated steam was evidenced in the case of engines of sister ships belonging to the same line, running on the same service and carrying the same pressures. On the high-pressure rod of one ship, where no care was taken to secure dry steam, the life of the packing averaged about thirty days' wear. On the engines of the sister ship, where care was taken to secure dry steam, the same packing has been in use for several years.

The principal objection of segmental packings is that they are expensive to manufacture and necessitate care in maintenance. They are generally of a complicated nature, since they comprise a large number of springs, segments and rings. As the packing is forced to the rod by the steam pressure, the friction on the rod or stem increases proportionally with increase in boiler pressures. In other words, it is almost impossible to use packings of this character on a triple-expansion engine and obtain anywhere near the same length of wear from the packings for the three different cylinders; the high wearing out most rapidly, the intermediate wearing out next rapidly, and the low lasting the longest.

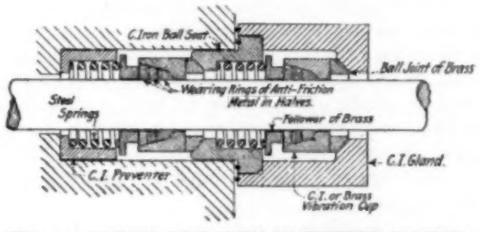


FIG. 3.—CONICAL RING FORM OF FLEXIBLE PACKING.

The last type of packing to be considered is usually known as the conical ring, and is shown by Fig. 3. This type of packing has given better satisfaction under adverse conditions than all others, and is the packing used on 90 percent of the locomotives running in the United States. This in itself is an evidence of its ability to run under adverse conditions with little repair.

The principle of this packing is that conical, soft-metal rings are pressed against the rod, and thus packing is accomplished by the rings being forced into a solid cup bored to conform to the outside of the rings. These rings are pressed into the cup partly by a spring, but principally by the steam itself. If the pressure of steam were constantly on the packing the springs would be unnecessary, as the springs are used merely to hold the packing in place while steam is shut off the engine.

In order that this packing shall be satisfactory, the cup must not be allowed to touch the wall of the stuffing box at any time. The proper design as well as the character of material of these packings is therefore the most difficult problem to be solved in the packing business, as the mixture of metal in the rings, as well as the form of the outside of the rings, must be such that the packings will merely prevent the leakage of steam and not cause excessive friction.

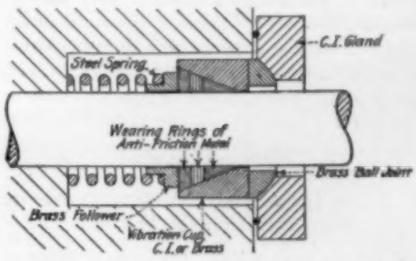


FIG. 4.—DOUBLE PACKING FOR STATIONARY AND MARINE ENGINE WORK.

Where properly designed, these packings can be made to give approximately the same length of wear on all the rods of a multiple-expansion engine. However, in practice it has been found that this is not entirely desirable, and so, when usually designed by first-class manufacturers, the high-pressure packings wear out a little while before the intermediates and low.

It will be often noticed that the shape of rings in packings of this character on the high-pressure rods is slightly different from that on the intermediate and low. In order to permit cheap and rapid repairs, it is desirable to have a uniform quality of metal used for the rings, while it is also necessary to have the form of rings balance differences in pressure.

With this type of packing there is absolutely nothing that comes in contact with the rod except the white-metal rings. The glands, neck bushings, cups, followers, etc., being bored considerably larger than the diameter of the rod or stem, and as the rings are made of soft metal and properly designed, they will cause very little friction and wear on rods.

Many experiments and tests have lately been made with packings of this nature, and where proper provisions are made to allow the rings and their enclosing cups to move freely with the rod they have been universally satisfactory. In order to allow the cup completely to accommodate itself to this condition, it is advisable to provide a ball joint in addition to the sliding face previously alluded to. A hot rod from packings of this type is practically unknown, and in railway service, where at the present time all details of this kind are apt to be carelessly handled, that they operate with any degree of success at all, speaks volumes for their design. In addition to the above, the advantages of this type are that wearing parts are inexpensive and easy to replace.

The disadvantage of these packings, if it can be called a disadvantage, is that they will not work properly on a rod unless the rod is cylindrical. When packings are applied, if the rod is cylindrical, even though it is grooved, these packings in a short time will become steam tight. There are many cases on record of extremely long service without renewals of this class of packing. Cases are on record of ten years' run, although the average life may

be taken as from two or five years, and then the packings may be put in as good condition as they were when new, by merely supplying a few inexpensive soft-metal rings.

Engine Efficiency Dependent Upon Character of Packings.

It is remarkable how little attention has been paid to this engineering subject and the ignorance of proper principles upon the part of engineers. It really requires very little cross-section of rings to do this work of packing, provided everything is properly designed; and the old notion, that the more rings and the deeper the stuffing box the better the packing, should be discarded as entirely wrong. If the packing manufacturer were consulted at the time engines were designed, it would often be possible on the ordinary marine engine to lower the cylinders from six to eight inches, and keep the other proportions of the engine exactly the same. From this can be readily seen the importance of this subject. Think of the weight of metal saved in six inches of housings, piston rods, valve stems, etc.

Increase in Piston Speeds and Cylinder Pressures Necessitates High-Grade Metallic Packings.

Until late years, and at the time when steam pressures were low and piston speeds moderate, almost any kind of packing would give fair success, as on account of these low piston speeds and steam pressures the crossheads and guides would run very close, and pistons would usually fit cylinders much closer than would be possible under modern conditions.

It will frequently be noticed that many of the old types of packing which met with first-class success until a few years ago are giving much trouble on the more modern types of engines, with their increased piston speed and steam pressure, not only wearing out more rapidly, but causing heating of rods, which is a proof of excessive friction.

Many new engines have been seriously injured on account of this improper design of packing. With packing of proper design it has been found that metals may be used for packing rings which melt at a temperature within 50 degrees F. of the temperature of steam in the cylinder. This is direct evidence of the small amount of friction.

Importance of Care in Design, Manufacture and Installation.

To go into this matter fully would require quite a long paper. To get an idea of how much thought and care is required to design the last-mentioned type of packing it should be borne in mind that the amount of curvature of ball joints bears quite an important relation to the wear of rings for different kinds of service. Also, as previously explained, the shape of the interior of cup and white-metal rings should vary to a certain extent with the steam pressure, and again the quality of metal used for the wearing rings requires deep study to meet the varying conditions. An instance of this can be seen in railroad service, where for years it was thought that nothing but a very expensive, high-grade babbitt metal would do for packing rings. After considerable experimental work had been done it was found that a metal costing one-quarter as much would not only prove more economical, so far as price was concerned, but would give much better service in the packing.

As superheated steam is slowly coming into use, the packing manufacturer must also follow and be able to take care of this question, and this requires a renewed study of the case and much experiment.

In practice, for most stationary and marine engine work, double packing is used, as shown by Fig. 4; that is, practically two stuffing boxes, the packing nearest the cylinder doing all, or nearly all, of the real work. The lower packing does little or no work until the upper packing is worn out or fails or leaks, when the lower packing catches this leakage or takes up the work in case of failure.

Careful Attention Necessary to Efficient Maintenance.

Regarding the care and maintenance of this class, we quote from instructions given by one of the well-known packing companies:

The principle of this packing is a cone cup (known as vibrating cup) around rod or stem, into which are fitted the soft-metal rings. The soft-metal rings are held in vibrating cup by a spring, and the steam pressure forces them to make a tight fit around rod when engine is working.

The principle of operation of this packing is that the soft metals, after joints come together, are forced by spring and steam pressure into the vibrating cup; hence to the rod by a flow of the metal itself.

The soft-packing metal rings which come in contact with the rod, and which do the actual work of packing, are cut in halves with a small open space between them when first applied, so that they may rapidly conform to the surface of the rod. When they have done this the open space between these rings will be closed up, ends coming solidly together, and in this condition rings are intended to wear, and will last four or five times longer than they would if continually cut so as to stand apart.

One-sixteenth of an inch is all the space required between the ends of the packing rings when they are applied.

If rings are continually cut apart at joints the wear on the rods will be large, and rings themselves will have an extreme tendency to force out between the opening of the vibrating cup and rod. If these rings do not work properly, when thus applied, and packings blow, there is something wrong, either with the mixture of the metal rings, the manufacture of the same, or the rod is taper or badly shouldered.

In applying new rings, or investigating trouble with packing, see that joints of rings are "broken." Examine faces of ball joint and vibrating cup and see that they are clean. Often packing will leak, due to foreign matter between ground faces of gland, ball joint or vibrating cup. Vibrating cups should fit within 1-64 inch of rods or stems. This will also prevent packing rings from being forced out between vibrating cup and rod, and will insure greater service of the rings. If absolutely necessary, soft packing may be used in the vibrating cups until rings are obtained, although it is far better to have spare sets of rings always on hand.

With double packings oil may be introduced into the lower stuffing box by means of a force pump. This oil when forced into the gland will entirely surround the rod, and the rod will then be running in a bath of oil. Should any leakage of water occur, it may be drained off and a little more oil introduced. By this means of lubrication swabbing of rods may be entirely dispensed with and a large amount of oil saved. In applying this method of lubrication it is well to be careful regarding low-pressure rods when working in connection with the condenser, in order to prevent oil from being drawn up through the packing into the cylinder.

In connection with low-pressure cylinders it should also be noted, in packings of the conical-ring type, that it is necessary to make the springs in this case sufficiently strong to counteract the tendency of the air to unseat the packings and enter the cylinder. This is the only case in which springs bear an important relation to packings of this type.

Co-operation of Manufacturer and User Essential to Development.

The packing manufacturer, in addition to his usual troubles, is often handicapped because he does not hear enough of the success or failure of his goods. If engineers assisted the packing manufacturer in this matter, stating the causes of trouble when it occurs, and working together with him in this way, I feel that much better results could be obtained than is the case at the present time. With multiple cylinders, high pressures and high piston speeds, this comparatively small part of the steam plant is growing rapidly in importance, and, although almost every engineer of note up to the present generation has patented, at some time in his life, a form of metallic packing, still hardly any of these are in use. There have

been thousands of packings invented, but at the present time there are less than twenty-five recognized packings in the market.

Injurious Effect of Water on Packings.

One of the greatest enemies and causes of trouble to any first-class packing is water in cylinders, which, when it occurs, demoralizes the packing. Strange to say, no metallic packing has been designed which will give first-class results as a water packing—the water rods of pumps, for instance. When first applied they usually work with fair success, but soon commence to leak and continue doing so. Also no thoroughly satisfactory packing has been invented and used for expansion joints. There is quite a large field for investigation in this direction.—[Journal Amer. Soc. Naval Engineers.

The Holthoff Machinery Co.

Several Eastern capitalists, headed by Benjamin Guggenheim, of New York, have purchased a large amount of stock in the Holthoff Machinery Co., whose plant is located at Cudahy, near Milwaukee. The interests of all the stockholders except those of H. C. Holthoff and B. T. Leuzarder are understood to have been acquired by the Eastern men, among whom, in addition to Mr. Guggenheim, are two other capitalists who are heavily interested in large mining propositions. The mining interests thus represented are alone sufficient to utilize the entire present output of the big plant at Cudahy. It is understood, however, that it is not the intention to confine the operations of the company, but that the financial backing now secured for the institution will be used to increase the capacity of the plant and develop it into an enterprise of large dimensions. The manufacture of mining machinery is expected to be continued as the chief business of the company, and Messrs. Leuzarder and Holthoff, who have been the principal stockholders of the concern, will retain their holdings of stock in the concern. The Holthoff Machinery Co. was organized several years ago for the manufacture of mining, milling, and special machinery by Messrs. Holthoff and Leuzarder, and under their management has developed already into one of the great manufacturing interests of Milwaukee. Mr. Holthoff is well known as a mining engineer of ability, and Mr. Leuzarder is prominent in the business world as a shrewd financier and able manager.

On the application of F. Wentz & Co., general contractors, of Canal Dover, O., Judge Walter G. Shotwell at Cadiz, O., Aug. 8, appointed Theodore Wentz and Attorney Harry Hostetler, of Canal Dover, receivers for the Standard Motive Power Co., of Canal Dover. The receivers filed their bond of $50,000 at New Philadelphia, Monday. A movement is on foot to reorganize at about $2,500,000 capital. The company was incorporated under the laws of Arizona and capitalized at $10,000,000. The company was organized to make standard locomotives and to manufacture steam engines and street cars under the Dodge patents. Howard McNutt, of New York, was the president of the company, and Arthur Pillsbury Dodge, the patentee, was first vice president. The company was given a site and a cash bonus was to have been paid as the work progressed. A large brick building has already been erected on the site and a $17,000 office building is nearly completed. The contracts had been let for the construction of two other large buildings to Pittsburg parties and the material is partly on the ground for the work to be commenced. Fred Wentz & Co., contractors of Canal Dover, have done work to the extent of about $17,000. A mechanic's lien has also been secured by another firm of Dover contractors for $17,000.

C. Davis & Co., dealers in iron and steel scrap, Pittsburg, have just opened storage yards in West Homestead, Pa., on the B. & O. R. R., and are ready to store all kinds of materials in iron and steel.

SAMPLES OF EARLY WORK.

BY W. O. PLATT.

Often our natural love of approbation leads us to try to believe that we are wiser and smarter than our predecessors, and we go along in that line until we run across something that shows us that others have been able to do good work also.

Out on the banks of the Allegheny river is an old blast furnace, Fig. 1, that is to say that there are some ruins that go to show that there was a blast furnace there at

FIG. 1.—RUINS OF FURNACE AT PRESIDENT, PA.

one time, how long ago you may imagine after looking at the picture.

The best preserved thing about it is a pair of large wooden cylinders that were once part of the blowing engine that furnished the blast.

The photograph, Fig. 2, will show that they were large and that they were built up of segments. Without being able to give any exact measurements, I will say that they are about six and a half feet in diameter inside, nearly six feet long, and about four inches thick. The wood is pine.

They are quite smooth and round both inside and out,

FIG. 2.—WOODEN CYLINDER OF BLOWING ENGINE.

and to all appearances are sound. The one that I examined most carefully was free from any defects, as far as could be seen, that would prevent its being still used.

I should never have suspected the purpose to which they had been originally put, as that was a new kind of material to me for an air cylinder. A gentleman who had known the place for a great many years gave me the following information. When he first saw the ruins there was enough left to show that these cylinders had set upright. Between them was a support that carried a walking beam, and this carried the heads, also of wood, that worked inside.

Leather was evidently used as packing as some was still attached to the heads.

The engine was driven by water power. A race nearly half a mile long is still to be plainly traced down to the stone foundation of the house that sheltered this primitive blowing engine.

The furnace has not been in use for upward of 40 years, and these wooden cylinders have been lying around exposed to the weather for not less than thirty years. How old they were when the furnace was discontinued there is no way of knowing, but it is not likely that they were new, and it seems remarkable to me that they should have kept their shape all these years.

In looking at them I have thought that the man that made them must have been a careful and experienced workman, and an excellent judge of timber, for he certainly has no reason to feel ashamed of the job.

Another relic that was hauled in one day from an old abandoned grist mill was a large "cog" wheel. It measured not less than seven feet in diameter, and the rim was a skeleton of holes made to receive the numerous cogs that made the teeth.

The man that hauled it in said that all the castings for the old mill had been made at one of the local furnaces "'way long before the war. I used to often hear my father telling about it." That could not have been later than the middle of the last century, and may have been nearer to the beginning of it.

I went carefully over this old casting to see what kind of molders they had in those days. The job would have been considered first class in any foundry in this country. I was not able to find a poor hole in the lot, and the spacing was fine. The edges and corners of the holes were sharp and square, and very little signs of dressing of any kind could be found. The hub and the arms were heavy compared to the light cut up section of the rim, and I found myself wondering how they kept the rim from cracking when the casting cooled, and also how long it took to make it, and whether that was the only one that had to be made to get what was needed.

There may be many foundries now in the country that would think the making of such a wheel a small job with their establishment equipped with all the modern improvements, but it is somewhat different to think of having to make it out in the wilderness, taking sand from some neighboring bank, iron direct from the ore, and with none of the modern appliances. Such things tends to show that we have not advanced so very far ahead of our forefathers as our conceit would sometimes lead us to think, even if we do get out a lot of work with our modern facilities.

The United States Circuit Court of Appeals at Philadelphia, Aug. 7, reversed the decision of the lower court favoring John Breslin in his suit against the Carnegie Steel Co. for infringement of a patent. He claims to be the inventor of an automatic table for delivering hot steel ingots from the rollers in steel mills. In the opinion handed down the judges of the Appellate Court find that the plaintiff was not a pioneer in the invention of the device, but, on the contrary, was merely an improver. It is also set forth that before the Breslin machine was patented there were many like inventions with foreign seals upon them. The judges held that there was no infringement whatsoever by the Carnegie Co.

The Dominion Iron & Steel Co. has made the following statement: "The boards of directors of the Dominion Iron & Steel Co. and Dominion Coal Co. have agreed on the terms on which the lease between the two companies shall be canceled, and are calling meetings of their respective shareholders to authorize an agreement carrying out the same. The particulars will be communicated to the shareholders by circular."

The Tula Iron Works and iron ore fields situated south of Guadalajara, Mexico, have been purchased by the Tula Iron Co., an American corporation which was recently organized with a capital of $4,000,000.

EASTERN PENNSYLVANIA.

HARRISBURG, PA., Aug. 11.—Conditions in the iron and steel works of Pennsylvania east of the Alleghanies have assumed a dullness which can not be entirely attributed to midsummer. Works are making their usual products, but there have been no records broken in shipments and the receipt of orders is said by many to be less than normal. Railroad and new construction orders in almost all lines of work for the year have been placed and now the manufacturers appear to be waiting for winter work. Prominent manufacturers say that payments to labor are not as high as they were a year ago, which indicates that affairs have come closer to their proper level and that labor troubles are being overcome.

The first steel made in Harrisburg will be made this week at the new open-hearth plant of the Harrisburg Pipe & Pipe Bending Works. This plant has been building for some time and is the second one in Harrisburg, the Central Iron & Steel Co. having one under construction. Many men have remarked upon the fact that Harrisburg has had steel made at Steelton, its very door, for thirty years, yet none has been produced in the city except in experiments.

The Pennsylvania State Capitol commission has given the contract for the six engines for the power plant to be installed in the new state house to the Harrisburg Foundry & Machine Works. The steel work for this $5,000,000 capitol is being made at Pencoyd.

Temple furnace of the Reading Iron Co. has been started after being out of blast less than six weeks, during which time it was relined and improved.

The Reading Iron Co. has established the office of assistant to the president, and it has been filled by David Thomas, formerly superintendent of the company's rolling mills at Danville, known as the Montour department.

There is talk of suspension of some of the furnaces in the Lehigh district. A number of the plants have stocked up and orders for fall are not heavy.

The Susquehanna Iron & Steel Co. has been operating its new Columbia pipe mill for the last ten days. The output has been fair.

Reading stove manufacturers say that they have enough orders to keep their works busy throughout the fall.

The proposed company to operate the Sheridan furnaces has not been very active and the stacks are still idle. It is said that considerable repair work will have to be done. Other stacks in the Lebanon region are in operation.

The Easton Foundry & Machine Co. was retarded in operations last week by trouble with striking employes. Deputy sheriffs have been guarding the works.

The Duncannon Iron Co. is running its works on double turn.

The Sweets Steel Co. has been formed at Williamsport to secure a Syracuse works for that town. The plant will cost a quarter of a million and it will be operated under a state charter.

The Lackawanna Iron & Steel Co. has completed a channel over 900 feet long at Lebanon, by which it diverted the waters of a creek and made a new water supply for the Colebrook furnaces and the coke oven plant. The entire work was built of concrete and the channel is 25 feet wide.

The Reading furnaces are being stocked with ore. Dauphin County furnaces are also taking large cargoes of Spanish ore.

Among the new corporations formed for the iron and steel business within the last ten days are the following, all of which have been granted state charters from the State capitol: The Black Diamond Engineering Co., of Monongahela City, capital $15,000; Crafton Hardware Co., Crafton, capital $10,000; Goyne Steam Pump Co., Ashland, capital $10,000; Latrobe Specialty Co., capital $15,000.

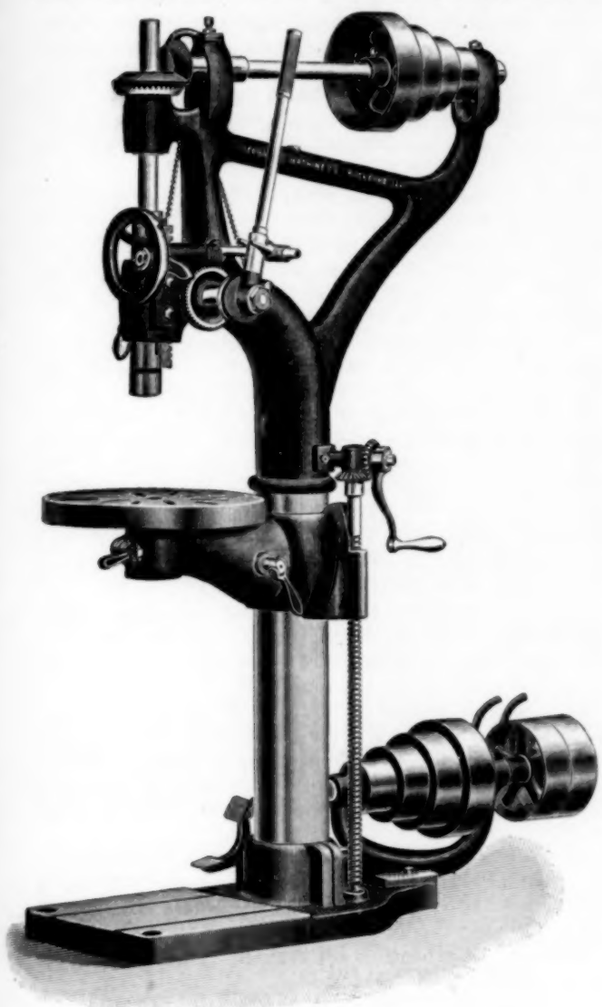
A charter has been issued by the State to the Shinn Slag Sand Co. to manufacture sand from blast furnace cinder at Pittsburg. The capital will be $20,000.

The furnace of the Central Iron & Coal Co., of Holton, Ala., which has been under construction for 18 months, was blown in last week.

20-INCH DRILL.

This drill is built by the Mechanics' Machine Co., of Rockford, Ill. One of the principal features is in connection with the upper cone shaft. When a drill has been running for some time the rear box will wear down and be so much out of line. This tendency is aggravated by the usually tight belt necessary to get the full amount of power out of the machine. The vertical position of the belt also requires so much more strain on the belt. The front box, near the drill spindle, has also a tendency to wear on the top side owing to the pressure of the bevel gears. For these reasons the two cones will get out of alignment and interfere with the belt running properly. Provision is made on the machine illustrated to adjust the boxes without rebabbitting them as is the common prac tice.

The leading dimensions of the drill are: Greatest distance from spindle to base, 41 inches; greatest distance



20-INCH DRILL.

from table to spindle, 27½ inches; distance from column to center of spindle, 10½ inches; vertical feed of spindle, 9⅝ inches; face of cone pulley is 2½ inches; spindle is fitted for Morse taper, No. 3; diameter of table, 16 inches; floor space, 15x48 inches; and weight of machine is 600 pounds.

The new steel plant at Monterey, Mexico, is now in full operation. The manufacture of structural steel was commenced two months ago and last week the first steel rails ever rolled in Mexico were turned out. The plant gives employment to 2,000 men, and at its mines 5,000 more men are employed. The company now has on hand orders from many of the Mexican railroads for large consignments of rails. The company was organized in 1900 with a capital of $10,000,000.

LAKE SUPERIOR MINING INSTITUTE.

Secretary Yungbluth has made the following additional announcements concerning the meeting of the Lake Superior Mining Institute to be held Aug. 18, 19 and 20:

The following arrangements have been made with the various railroads for transportation: From Mesabi and Vermillion ranges and Duluth, one fare for the round trip to Ishpeming, full round trip tickets will be issued. From the Gogebic and Menominee ranges and the copper country, one and one-third fare. Persons purchasing tickets will take certificate from the agent which upon being endorsed by the secretary and joint agent at Ishpeming will entitle purchaser to a return ticket for one-third of the regular fare. From points not above mentioned a rate of one and one-third fare has been made on the certificate plan. Tickets will be sold on Aug. 16, 17 and 18 good for return leaving Ishpeming until Saturday, Aug. 22. The Nelson House has been designated as headquarters for the party while in Ishpeming and members are requested to assemble there upon arrival of trains and secure badges and sleeping car accommodations for the excursion to the Soo. The first excursion will leave Ishpeming at 10:30 Tuesday morning for Maas mine at Negaunee. Tuesday afternoon will be spent at the mines in Ishpeming. The first business session will be held at the opera house in the evening. Wednesday morning the party will leave for Marquette and Munising, leaving the latter place in the evening and arriving at the Soo Thursday morning where the day will be spent visiting the various points of interest. Returning, will arrive at Ishpeming Friday morning in time to meet outgoing trains. The final business session will be held at Munising, Thursday evening. Itinerary of the trip with local time cards and other necessary information will be furnished members upon arrival at Ishpeming.

The following is list of papers to be presented during the meeting: "Sinking and Equipping No. 9 Shaft, Ashland Mine," by H. F. Ellard, Ironwood; "A Card System for Mine Supply Accounts," by F. W. Denton, Atlantic Mine; "Titaniferous Iron Ores," by Dr. Nelson P. Hulst, Duluth; "Iron Ore Deposits of Arctic Lapland," by Chase S. Osborn, Sault Ste. Marie; "High Explosives, Their Safe and Economical Methods of Handling," by J. H. Karkeet, Iron Mountain; "A New Changing House at the Cliffs Shaft Mine, Ishpeming," by John S. Mennie, Ishpeming; "Materials Other Than Wood for Shaft Linings," by Prof. F. W. Sperr, Houghton; "The Champion Mill Intake Tunnel," by F. W. O'Neil, Painesdale, Mich.; "Mine Accounting," by Walter M. Jeffery. Titles to several papers not yet received.

A white metal pattern must be hard enough to withstand more or less rough usage. An alloy of 80 parts of tin and 20 parts of antimony is recommended by *Metal Industry*, but many object to the expense of the tin. If a cheaper mixture is desired, an alloy of 80 parts of lead, 10 parts of antimony, and 10 parts of tin may be used. If these alloys, however, are not tough enough the amount of antimony may be decreased. Patterns made from them may be readily soldered with soft solder (half and half). The alloys will also melt in an iron ladle, a necessary feature in pattern-making.

A transcript has been filed in the United States Circuit Court of Appeals at Cincinnati in the matter of Joseph T. Ryerson & Son, the Iroquois Engine Co. and Rogers, Brown & Co. to have the Lansing Boiler & Engine Works of Michigan adjudicated a bankrupt. Rogers, Brown & Co., of Cincinnati, claim $736.01; Ryerson & Son claim $1,750, and the Iroquois Engine Co. claims $1,461.63. The appeal is asked by the Lansing Boiler & Engine Works, which appeals from the decision of the court of the Eastern District of Michigan in declaring it a bankrupt, and denying that it made conveyances to creditors in order to defraud others to whom it owed money.

THE CARE OF PRIVATE FIRE APPLIANCES.*

BY GORHAM DANA.

Fifty years ago, when private fire protection depended on fire buckets, augmented occasionally by standpipes connected to small pumps, the care of private fire appliances was a simple matter. Anyone with ordinary intelligence knew how to care for a pail and how to use it when needed. Within the last half century, however, developments have taken place in methods of fighting fire so revolutionary that today it requires men especially trained for the purpose to care for and to use the modern fire appliances such as are found in large manufacturing plants, department stores, theaters and the like. While the inventor has been busy perfecting automatic sprinklers, dry valves, alarm valves, Underwriter steam pumps, automatic regulators, thermostats, chemical extinguishers and many other devices, the Underwriter has been at work making rules for the installation of the same. In America largely through the efforts of the National Fire Protection Association,these rules have been perfected and unified at great expense of time and money so that today there are national rules covering the construction and installation of almost every fire protecting device of importance on the market.

The Underwriter has kept abreast of this development and has indeed been largely instrumental in the progress made. He has been quick to realize the importance of new devices and to give them due credit in rating.

But has the mill owner and the factory superintendent, the theater and store manager done his share in developing modern protection? Has he been willing to investigate and test new devices? Has he been willing to install such devices even after their value has been proved except when a considerable reduction in rate has been offered? I believe that as a rule he has not. Again has he instructed his help in the use of apparatus after it was put in and has he taken means to see that it is kept in order at all times? In short has the care of fire appliances kept pace with their development? Our experience in New England shows that it has not. To find sprinkler valves shut, pumps out of order, tanks empty, fire doors broken and thermostats crippled is an almost daily occurrence.

The chief desire of a large class of property owners seems to be to get the device installed to the satisfaction of the Underwriters so that they can get their promised reduction in rate and then to let the costly and complicated apparatus take care of itself.

Others seem to consider it necessary to economize in the care of fire appliances by hiring cheap incompetent men as watchmen and mechanics, by not keeping up steam at all times for their pumps and by not spending the necessary money on repairs. Are not fire protection devices as important as other machines that they are thus neglected? When needed they are the most important machines in the mill and they are liable to be needed at any minute.

Another class of managers may be credited with a conscientious desire to keep their fire appliances in order but through carelessness and oversight due to the press of other business they allow them to become neglected. Few managers apply the same business principles to the care of their fire appliances that they do to other departments of their business.

Many men who have never had a fire in their plant fail to realize the importance of good fire protection and take but little interest in the subject. Such men are very apt to fall back on their fire record and think that they have a fine risk and that modern appliances are quite unnecessary. Experience, however, is a great teacher and after a baptism of fire such men look on the matter through different eyes and are not only willing but anxious to have good protection and to keep their apparatus in order.

But fire is a costly teacher and one hardly to be recommended. The assured must be educated in a simpler and less expensive manner.

A large number of the serious fires in sprinklered risks in America during the last few years may be attributed to fire appliances being out of order due to defective care. Tanks empty, pumps out of order or without steam supply, alarm giving devices out of order and closed supply valves account for most of them.

Ineffective use of appliances due to unfamiliarity with them and ignorance is also an important factor in many fires. Occasionally we find a plant where all the employes are carefully instructed as to the use of fire appliances and are assigned certain duties in case of fire. In some of the large department stores where a large number of lives as well as large values are at stake, complete instructions and description of devices are issued in pamphlet form and given to all employes.

In a majority of plants, however, most of the employes know little or nothing about the fire appliances and in case of fire either waste a great deal of time and work to poor advantage or else lose their heads entirely and accomplish nothing.

Fire appliances are emergency devices and are not kept in order through constant use as are most appliances in a mill. The only way to care for such emergency devices is by systematic inspection. How and by whom shall these systematic inspections be made? There have been attempts made to solve this problem in several different ways.

First: Inspection by the company installing the device. In Russia sprinkler equipments are regularly inspected by a corps of inspectors employed by the contractor who puts in the system. In America, especially in the large cities, it is customary to have automatic thermostat systems cared for by the company that installs them.

This system of caring for fire appliances is not, however, without its faults amongst which may be mentioned the following: (a) It would require a separate set of inspectors for each kind of device installed. Thus there might be a set of inspectors for sprinkler systems, another for thermostat systems, another for pumps and so on. This would in some cases make a great number of inspections during the year. There are certain minor devices like chemical extinguishers which it would hardly pay to send a special man to inspect and as a result under this system they would never be tested or inspected.

(b) Such a system would also tend toward preventing the assured from becoming familiar with the appliances and taking off his shoulders all responsibility in case anything was out of order when needed.

(c) Such inspectors could not as a rule make frequent enough inspections to give the best results. The best that could be hoped for would be monthly or quarterly inspections. This is entirely inadequate especially for such delicate apparatus as thermostats where daily inspections are none too frequent.

(d) The cost of such a system is considerable and falls directly on the assured. Of course the expense falls finally on the assured under any system but where it falls indirectly as in the case of bureaus supported by the insurance companies the expense is not realized. Direct taxation is never popular.

In defense of this system it may be said that inspectors hired by contractors are more apt to understand the device thoroughly than others; they also have a certain pride in seeing that it does its work properly when called upon and are (or should be) men who are able to repair the apparatus on the spot in case it is found out of order.

Second: Inspection by bureaus supported by the insurance interest is the second method of solving the problem. This method is very common in America and is carried on over almost the entire country for the most valuable and best equipped plants.

Here again we find the defect of too infrequent inspections. In some of the large cities, regular inspections are made every month but once in three or four months is the general rule. It becomes too much of a financial burden for the insurance companies when inspections are made much more frequently.

On the other hand the work is done more cheaply than

*Read at the recent meeting of the International Fire-Prevention Congress at London. The author is with the Underwriters' Bureau of New England.

by the previous method, for one inspector now does the work of several and requires but little more time for his inspection. He is also unprejudiced and looks out merely for the interest of his companies, namely the prevention of a fire if possible and its control with the least possible loss if it does occur. Such an inspector not only looks after the fire appliances but also investigates hazards and offers suggestions for improvements that undoubtedly result in greatly lessening the fire waste.

Third: Inspection by the assured is found in some of the largest and best managed plants in America. Some competent man is instructed to make a complete inspection of the plant once a week, to test or examine all fire appliances and to make a written report of the condition of same. This is handed to the manager or superintendent who looks it over and then files it away for reference. By this method nothing can be out of order over a week without the manager knowing about it. Occasionally this system of self inspection is carried to the point of making daily inspections especially of vital features like supply valves on sprinkler systems.

The blank used for this purpose will vary with each risk but there are certain important features common to all plants. In our territory we have a general blank printed which covers all important features that are likely to be met with. This blank is corrected or added to to apply to any particular risk and a copy is then sent to the assured which they can use as a basis for a special printed blank.

This scheme of self inspection if properly carried out is certainly the ideal method of caring for fire appliances but in practice it falls far below the ideal. The man detailed to make the inspections, unless he be a very exceptional man, is too apt to do the work in a perfunctory manner. He will report a device in good order without actually testing to see that it is so. It is far easier to enter O. K. on the blank than to actually test a pump for instance. Some check is needed on the average man and indeed on the best man for no one is infallible. This might be obtained by having a second employe make the inspections occasionally. Even then there is a chance of collusion between the two men in case something is out of order that reflects on the proper performance of their own duty. There is also a chance that both will be careless.

The system has the great advantage of frequent inspections which it is impractical to obtain by either of the other systems mentioned.

It will be seen that each of the systems has its defects. How then are we to get satisfactory results? There seems to be but one answer to the question. It will be noticed that the same defects do not exist in all the systems therefore a combination of the three ought to eliminate the defects.

A thorough and systematic inspection by the assured conscientiously carried out, occasional inspections by trained surveyors from the insurance companies and in case of complicated devices that require expert care, regular inspection by the company that installs them, these three combined should give the desired result.

In conclusion it may be of interest to give a short description of a plant where this combined system is found in a high state of development.

The Grand Trunk Railway Terminal property at Portland, Maine, is an excellent example. This property has an insurable value at some times of the year of over $5,000,000, and fire protection costing nearly $80,000 has recently been installed to protect it.

There are two large grain elevators one of a capacity of 1,500,000 bushels and the other of 1,000,000 bushels. Each elevator has its own power plant. There are eight large dock sheds divided into three groups, each group having a floor area of approximately 10,000 square feet. An elaborate system of covered grain conveyors extends from the elevators to the docks. In addition there is a passenger station, freight station and administration building.

The grain elevators are completely equipped with automatic sprinklers supplied by two pressure tanks in the top floor of each and by two 1,000 gallon automatic steam pumps in a fireproof pump house in the yard. There is also a 500 gallon steam pump at each engine room which can be used as sprinkler supply. The sprinklers are piped with extra large pipe sizes and are on the dry system. The equipment is divided so that there is only approximately 200 heads on a dry valve. This requires eight dry valves in one and seven in the other elevator. Each dry valve is connected to a rotary alarm bell and also to an electric bell and annunciator in the engine room.

There is a yard system of nine hydrants supplied by city water under 60 pounds pressure. These are fed by a 10-inch loop connected to an 8-inch and a 12-inch street main and are primarily for steamer supply. The city pressure would not reach to the top of the elevators which are 175 and 160 feet high respectively. There is a second hydrant system supplied by the pumps and this is under 100 pounds pressure at all times. These hydrants are fitted with standard hose houses containing 250 feet of hose and other equipment.

All journal bearings of any importance are equipped with solder release journal bearing thermostats. These are connected to electric bell and annunciator in their engine house and in case any bearing reaches a temperature of over 165 degrees an alarm is given at this point. There is also a system of manual alarms located throughout the docks and elevators connected to gongs and annunciators in each engine house.

The grain conveyors are equipped with sprinklers where they adjoin the elevators and for a distance of about 200 feet beyond. The docks contain a system of monitor nozzles, thirty-six in all, located about 120 feet apart. They have an outlet of 1½ inch, are set up about 5 feet above the floor and are supplied by the pumps under 100 pounds pressure.

In the grain conveyors there are two fire stops, one consisting of a fireproof section 90 feet long with a tin covered partition at each end. There is also a wire cable hung at a conspicuous place on one elevator to be used in wrecking the conveyors in case of fire. This is done by passing it around two of the supporting posts and attaching it to a locomotive.

The electric circuits of the alarm system, the journal bearing thermostat system and the manual alarm system all have testing devices whereby every foot of wire can be tested daily and a record kept of same.

There is a private fire department of twelve men who drill weekly. The chief of this department is hired for the express purpose of caring for the complicated fire appliances and this is his whole duty. He makes a daily inspection of all appliances and a report on same which covers three large pages. These reports together with the watchman's dials, the dials giving a record of four sets of electric tests and the automatic steam pressure gauge dials are all examined daily and kept on file by the agent.

The plant is also inspected at least four times a year by an insurance inspector who as a rule spends 1½ to 2 days in making his inspection. He also looks over the records above referred to and checks them up.

As a result of this admirable system the fire appliances are kept in as perfect condition as could be desired. Several fires have already been extinguished with but little loss, one a dock fire amongst cotton bales that would undoubtedly have destroyed a third of the dock property at least were it not for the protection devices and the excellent organization to handle them.

May we not hope that equipments of this kind may be the rule instead of the exception at some time? It is certainly the goal toward which we should all strive.

(A sample inspection blank for the use of the assured was appended to the paper and in brief, this form gives the location of each piece of apparatus and a report of its condition every week. Tests are enumerated and there are notes bearing upon the importance of certain precautions, etc. Under "Automatic Sprinklers" for instance is given:

"Any corroded, bent, whitewashed, gilded or painted, covered with dirt or grease, obstructed by clothing, partitions, shaft hangers, ...

"Is there a clear space of at least two feet below level of sprinklers free from storage or other obstructions....

"Note any exceptions.....")

FUEL OIL*

BY JOHN F. ROWLAND, JR.

Under the conditions of using a triple expansion engine, a horsepower hour may be obtained for a pound and a-half of coal per hour, and if the boilers, engine and condenser be properly looked after, this result is continuously possible, using the average grade of either anthracite or bituminous coal.

It may be either from the impossibility of using steam in this multiple expansion manner because of the smallness of the unit, or the undesirability on account of the difficulty or expense of obtaining condensing water, that power is had from the expansion of steam in a single cylinder without a condenser.

The endeavor to obtain from this latter condition the best possible economy has resulted in the numerous devices for supplying coal to a boiler in a mechanical manner, both in the natural and pulverized forms.

There has been supplied in the same natural manner another form of combustible than coal, which is the subject of this evening's discussion, viz., oil.

For many years refined oils have been used as fuel where the greater heat value alone determined the selection, but its use in large quantities where it has replaced coal is confined to such as is found in the natural state.

There are about 19,000 heat units in a pound of oil, and about 12,000 available ones in a pound of coal.

In comparing the two fuels, it is not alone the difference in heat value per pound that must be considered.

There are objections to the use of coal which would make oil the more desirable fuel if the heat values were the same, provided the cost of oil allowed the selection.

In the ordinary way of firing coal there is the opening and shutting of the fire door with the constant change of temperature and the effect of this change upon the furnace, the combustion chamber and tubes in an internally fired boiler, and upon the shell or tubes in an externally fired one.

It is from the effect of this change that most of the deterioration in boilers is due, and most of the expense of upkeep is entailed.

The deposition of soot on the tubes of a boiler constitutes perhaps the greatest heat waste in burning coal, and coal can hardly be burned in a manner to prevent this. Until the ashes from the burning of coal are removed from the vicinity of a boiler, there is a constant deterioration of any metal with which they come in contact.

It is possible, in burning oil, to dispense entirely with the temperature changes, there are no ashes to remove, and careful burning of the oil leaves very little unburned carbon.

The burning of oil entails a minimum of expense for operating.

The oil may be burned with the use of either steam or air, or a combination of the two, to atomize it and to provide sufficient oxygen for combustion.

In selecting an oil burner that uses steam to atomize the oil, care must be taken that the quantity of steam be not too great a percentage of the total amount generated.

If the plant where oil is burned uses pneumatic tools, it may be more advantageous to use air.

Where a forced draft system of combustion is used, a combination of steam for atomizing and air for combustion may be used, and this combination gives results that have probably not been exceeded for economy.

In a plant of over 4,000 horsepower, using steam to atomize the oil and air at a pressure of 3 inches of water for combustion, there is obtained regularly a net evaporation of 14.1 pounds of water from and at 212 degrees per pound of oil. The tubes are sponged in this plant once a month, as against every day when coal was used, and no repairs to furnaces or tubes have been necessary after seven months.

There is a considerable difference in the price of oil, depending on the distance it has to be carried, and while the price may be prohibitive where the distance is great, the fact remains that oil is largely superseding coal as a fuel, and when the economy of operation where oil is used has been continued for a sufficiently long time to have the results studied and diffused, there is no question that oil will be still more generally used as a fuel.

*Read before the Mechanical and Engineering Section of the Franklin Institute.

Proposed Car Wheel Consolidation.

A consolidation of eight Eastern car wheel plants is now under promotion, and there is every indication that it will be successfully carried out. Appraisals are being made and it is probable that the organization of the new company will be completed within about two weeks. The plants to be consolidated have a daily output of about 2,700 car wheels, daily consuming approximately 1,000 tons of iron and scrap. The new company will have a larger output than any one car wheel concern now operating and will produce about one-fourth of the wheels produced in this country annually. The American Car & Foundry Co. and the Griffin Car Wheel Co. are the two largest producers at the present time, their plants giving each an output of about 1,000 wheels daily. The Pennsylvania Railroad Co., among the railroad interests, operates the largest plant in the country at Altoona, Pa., with a daily output of 500 wheels per day, and upon the completion of its new car wheel foundry the output will be increased to 800 wheels daily. The following concerns have given options on their plants: Rochester Car Wheel Co., Rochester, N. Y.; Maher Car Wheel Co., Cleveland, O.; New York Car Wheel Works, Buffalo, N. Y.; Cayuta Wheel Co., Syre, Pa.; Lobdell Car Wheel Co., Wilmington, Del.; Maryland Car Wheel Co., Baltimore, Md.; Ramapo Car Wheel Co., Ramapo, N. Y.; Keystone Car Wheel Co., Pittsburg, Pa. The Central Car Wheel Co. and the Pennsylvania Car Wheel Co., at Pittsburg, Pa., are not included in the new consolidtaion, as the former produces wheels for the Standard Steel Car Co. and the latter for the Pressed Steel Car Co. The Central plant is located at McKees Rocks, and is owned and controlled by interests allied with the Pennsylvania Malleable Co. The two plants have a daily output of nearly 1,000 wheels. Several names are under consideration for the new consolidation, but none has been definitely decided upon. The company will be capitalized on a very conservative basis, the figures of the appraisers to be alone considered in fixing the capitalization.

The new plant of the United Steel Co., Canton, O., will be placed in operation about the middle of September. The open-hearth department contains three 45-ton open-hearth furnaces with a daily capacity of 275 tons, while the rolling mill contains a 34-inch universal mill on which sheet and tin bars, skelp and plates can be rolled. The mill will supply the plants of the Berger Mfg. Co. and the Carnahan Tin Plate Co. with steel for their mills inasmuch as the two interests allied to build the plant for this purpose. About 150 tons of material will be taken in this way and from 125 to 150 tons daily will be sold in the open market.

Thorough tests are to be made by the Pennsylvania Railroad of high-class French locomotives, a DeGlehn four cylinder compound having been ordered built for this purpose. It will be received next year, and will be given a test and then made a part of the railroad company's exhibit at St. Louis. After the close of the exposition the locomotive will be placed on the road for regular runs. Tests will be made to determine the uniformity in rail pressure due to the balanced engine, as well as its economy in coal and water consumption.

Willard P. Voorhees, of New Brunswick, N. J., has been appointed receiver for the Perth Amboy Shipbuilding & Engineering Co., of Perth Amboy, N. Y. The appointment was made upon the application of A. R. Ramsey, treasurer of the company. The liabilities are $311,000 and the assets $170,000.

PERSONAL.

J. Edward Springer, of Martin's Ferry, O., has been secured by the Portsmouth Steel Co. as superintendent of its bar and plate mills.

John Morgan, of Granite City, Ill., has taken charge of the blooming mill and open-hearth department of the Portsmouth Steel Co. William Sprayer, of the Aetna Standard Works, at Bridgeport O., has been secured to take charge of the plate mill.

E. K. Orr, formerly connected with the sales department of Jos. T. Ryerson & Son, and for six years the Western manager for the Shelby Steel Tube Co., will Sept. 1 open offices in the Monadnock Block, Chicago, acting as a distributer of iron and steel products. He has arranged to act as the direct Western representative for several concerns, but desires a few additional accounts and is in a position to accept the Western or Chicago representation for manufacturers of pipe, strip steel, billets, shafting, boiler tubes and other materials, and solicits correspondence with makers desiring Chicago connections.

C. E. Buek, a well known iron man of Birmingham, has retired from the Chattanooga Furnace Co.

Dr. Rentzsch, of Dresden-Blasewitz, who has compiled the statistics published by the Association of German Iron and Steel Masters for more than thirty years, will retire on Oct. 1. The compilations will be undertaken by the Berlin office of the association under the direction of Mr. Bueck, general secretary, and Dr. Leidig.

N. H. Ashley, who for twelve years was connected with the office of Rogers, Brown & Co., at Buffalo, N. Y., is now associated with Hugh W. Adams, sales agent for the Sloss-Sheffield Co. and Reading Iron Co., at 132 Nassau St., New York.

V. C. Armstrong has replaced W. M. Mitchell, as the New York agent of the Dominion Iron & Steel Co., Ltd., at 100 Broadway. Mr. Mitchell is now with the Alan Wood, Iron & Steel Co., Philadelphia, Pa.

The Iron and Steel Institute.

The autumn meeting of the Iron and Steel Institute will be held at Barrow-in-Furness, England, on Tuesday, Wednesday, Thursday and Friday, Sept. 1, 2, 3 and 4. The program includes a short address from Mr. Andrew Carnegie, the president, and the presentation of the following papers: "On Alloys of Iron and Tungsten," by R. A. Hadfield; "On the Restoration of Dangerously Crystalline Steel by Heat Treatment," by J. E. Stead and A. Windsor Richards; "On Sorbite Steel Rails," by J. E. Stead and A. Windsor Richards; "On the Influence of Silicon on Iron," by Thomas Baker; "On the Diffusion of Sulphides Through Steel," by Prof. E. D. Campbell; "On the Heat Treatment of Steel," by William Campbell; "On the Rolling of Large Pipes," by R. M. Daelen; "On the Regulation of the Combustion in Coke-oven Practice," by D. A. Louis; "On the Fuel Used in the Barrow District," by W. F. Pettigrew; "On the Diseases of Steel," by C. H. Ridsdale; "On Carbon in Steel," by Prof. A. Stansfield. Visits to the Barrow Hematite Steel Co., the Askam blast furnaces, Hodbarrow mines, the naval construction works of Vickers, Sons & Maxim, the shops of the Furness Railway Co., the Roanhead mines and the Lonsdale blast furnaces, are anticipated as time may permit.

The Association of French Manufacturers is reported as offering a $200 prize for a protecting cover to prevent accidents from bursting of "artificial grindstones." The guards entered for competition must prevent the fragments being thrown into the workshop and must maintain their efficiency no matter how much the grindstone may be worn down. They should be inexpensive, easily applied to any ordinary machine and not obstruct work in any way. Competitors are required to address "a very complete descriptive note with explanatory sketches" to the president of the association, 3 Rue de Lutèce, Paris, before Dec. 1. The maker of the apparatus which is selected for trial must submit two specimens, one of which is to be fitted by them, or at their expense, in a workshop and tested for fifteen days in general use. The other will be tested by bursting the wheel over which it has been fixed. The tests will commence on April 1, 1904, and the prize may be divided. The inventions remain the property of the competitors, but the committee will have the right to publish descriptions, etc.

Owing to the financial straits of the Columbia Iron Works Co., Port Huron, Mich., the shipyard at St. Clair has been turned over to J. C. Gilchrist, the Cleveland vessel owner, who will take charge of the work the company has now on hand. The officials of the company state that if they are allowed to continue, every claim will be paid in full. In the legal papers filed the total indebtedness of the concern is scheduled at $368,000, while the assets, according to the appraisement, are placed at $179,475, although the original cost is said to have been $409,156. The following are among the heaviest creditors: State Savings Bank, Detroit, $100,000; A. D. Bennett, trustee, Port Huron, Mich., $55,000; Commercial & Savings Bank, St. Clair, Mich., $15,248; American National Bank, Los Angeles, Cal., $10,000; First National Bank, Chicago, $8,000; Jones & Laughlin, Pittsburg, $29,582; Betts Machine Co., Wilmington, Del., $11,012.

The Rostand Mfg. Co., New Haven, Conn., recently incorporated, does not intend to build, as it is comfortably and conveniently quartered at 137 Park street, New Haven. Its business is the manufacturing of Mac's Metal Polish, favorably known by the N. Y. Fire Department and other fire departments throughout the country, and by the large steamship companies, among which is the Old Dominion Steamship Co., also Yale Metal Polish, a polish which is used almost exclusively by the War Department and on Government transport vessels. The company also manufactures a number of specialties and is in a position to furnish all kinds of spinnings either in brass, copper, aluminum, Popes Island metal. It also does brass turning both from the rod and castings.

The legal battle over the appointment of a receiver for the property of the Union Iron Works, San Francisco, has been in progress for a week or more in the United States court in that city. Henry T. Scott, chairman of the board of directors of the company, testified that the company is perfectly solvent, and that there is no necessity for a receiver. He states that during the time he had been connected with the management the profits were extremely small. He stated that on the battleship Wisconsin, which took three years to build, the profit amounted to only $14,000.

The fifteenth annual report on the statistics of railways in the United States, being for the year ending June 30, 1902, has just been made public. During the fiscal year the railway mileage of the country increased 5,234 miles, and on June 30 amounted to 202,471 miles. The number of locomotives in service was increased 1,644 over the previous year. The gross earnings of the railways were $1,726,380,267, being an increase of $137,854,230, as compared with the previous year. The net earnings were $652,671,623, an increase of $61,586,507 over the previous year.

The Susquehanna Iron & Steel Co. held its annual stockholders' meeting a few days ago in Philadelphia. It was shown that the assets of the company amount to $1,760,331, with liabilities of $1,777,064, inclusive of the capital stock of $1,500,000. The business of the past 6 months showed a loss of $74,351, which left a net deficit of $16,732. The following directors were elected: Charles A. Porter, J. W. Steacy, H. F. Bruner, R. J. Houston, Dr. L. S. Filbert, James G. Lindsay, William R. Butler, John Q. Denny and Henry Clay.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Alabama-Virginia Iron Co., Florence, Ala., wants 275 feet 10-inch cast-iron water pipe, bell joint; 550 feet eight-inch cast-iron water pipe, bell joint; 150 feet four-inch cast-iron water pipe, one eight-inch T with four-inch branch, twenty-five pieces of tank steel ¼ inch x 36 inch x 120.

Alabama-Virginia Iron Co., Florence, Ala., wants one duplex pump, 10-inch suction, 8-inch discharge.

The Spiller Crude Oil Stove Co. has been incorporated at Austin, Texas, with capital of $150,000, for manufacturing Spiller's oil burners and stoves, by P. S. Spiller, H. P. Haldeman, John K. Donnan and C. L. Test.

The Newport News Shipbuilding & Dry-Dock Co., Newport News, Va., will equip the extension to its foundry now being built with latest machinery and appliances for the manufacture of steel castings. Addition is about 150x60 feet.

Baker, Stillwell & Hart, Birmingham, Ala., want 45 feet of second-hand shafting 2 15-16 inches in diameter, complete with couplings, and an 8-post hanger for same.

Seminole Lumber Co., Lake City, Fla., is in the market for return tubular boiler 125 horsepower and one slide-valve engine of 100-horsepower.

Alabama-Virginia Iron Co., Florence, Ala., wants two 75-horsepower boilers and one 50-horsepower engine.

E. V. Wyssbred & Co., Panola, Ky., are in the market for 5 miles of relay rails and two small locomotives suitable for use on tramroad.

Alabama-Virginia Iron Co., Florence, Ala., wants one H. K. Porter saddle-tank dinkey 8-ton 36-inch gauge, 3,000 lineal feet 30-pound steel rails and fastenings, 1,000 lineal feet 18-pound steel rails and fastenings and one 6-ply 18-inch belt.

H. A. Rankin, Fayetteville, N. C., wants to buy second-hand 15 to 20-horsepower engine.

The Saluda Trade Co., Lock Box 2, Saluda, N. C., wants prices on traction engine of 10 to 12-horsepower sufficient to haul five to six loaded wagons in hilly country.

The Stein Improved Chimney Construction Co., J. B Dryer president, Birmingham, Ala., will need a few gasoline hoisting engines.

Chas. Jacobson, Warren, Pa., has organized a corporation with $1,000,000 capital to carry on the manufacture of gas engines. This corporation will be known as the Jacobson Gas Engine Company. For several years Mr. Jacobson has been manufacturing and marketing his engines in connection with Struthers, Wells & Company, of Warren, Pa. The engines have proven so satisfactory that he was encouraged to organize the above mentioned company, the expectation being to manufacture not only the sizes and types heretofore furnished, but also other sizes and styles. He has already secured valuable patents in connection with his engines and has others pending.

The Ashland & Ironton Bridge Co. and the Ironton & Kentucky Bridge Co. have been consolidated with a capital of $1,200,000. The new concern is to be known as the Ashland & Kentucky Bridge Co., and its purpose is to construct a railway bridge across the Ohio river between Ashland and Ironton.

The John Johnson Co., of New York City, has been incorporated with a capital of $60,000 to manufacture filter presses and machinery. The directors are S. H. Johnson, of Warren Hills, England; J. E. Johnson, of Brooklyn, and H. J. Linder, of Mt. Vernon.

The Montross Iron & Steel Works, Frederick, Md., has been incorporated with a capital of $250,000. The incorporators are: Thomas M. Diven, Charles F. Rothenhoefer, William P. S. Diven, Charles W. Demmy and Arthur Latterner.

W. J. Dodge and associates, of Gadsden, Ala., have leased the Caldwell Foundry at Fort Payne, Ala., and will organize a company with $25,000 capital to operate it. Repairs will be made and additional machinery installed.

The West Allis Malleable Iron & Chain Co., West Allis, Wis., has increased its capital from $100,000 to $150,000.

The Anderson Machine & Foundry Co., Anderson, S. C., has increased its capital from $10,000 to $20,000.

The Elmira Tube Mfg. Co., Elmira Heights, N. Y., has been organized with a capital of $45,000. The directors are: Franklin Magrath, M. L. Bland and W. S. Franklin, Brooklyn.

Henry V. Maxwell, Ransoms Bridge, N. C., wants to buy 50-horsepower second-hand boiler.

Merchants' & Farmers' Peanut Co., Norfolk, Va., will need 75-horsepower engine and 100-horsepower boiler, shafting and pulleys.

W. D. Moran & Co., Cooper, Tex., want prices on boilers and engines.

W. H. Gibbes & Co., Columbia, S. C., are in the market for 125-horsepower detached engine, side crank, with automatic governor, or with throttling governor; second-hand. Give full description.

P. O. Box 798, New Orleans, La., wants to purchase one 8¼x10-inch double cylinder and double drum hoisting engine without boiler.

Baker, Stillwell & Hart, Birmingham, Ala., want prices delivered Birminghan on second-hand 60-horsepower side-crank slide-valve engine, left-hand, immediate delivery.

The American Well Works, Aurora, Ill., is in the market for a steam hammer from 2,000 to 3,000 pounds, immediate delivery.

The Southwestern Pump Co., Witchita, Kan., has been incorporated with a capital of $25,000. The company was formed to purchase the plant and buildings of the defunct Buckeridge Pump Co. It is expected that the plant will be in operation by the first of September

The Pittsburg Marine & Engineering Co. has been organized under the laws of Maine for making and dealing in engines, boilers, pumps, etc., capital $150,000.

Kraut, Dohnal & Co., Chicago, capital $1,500, have been incorporated to manufacture and deal in cutlery and hardware.

The Marion Repair & Machine Co., Indianapolis, has been incorporated with a capital of $5,000.

The Bridgeport Hardware Mfg. Co., Bridgeport, Conn., has increased its capital stock from $50,000 to $75,000.

The Standard Tool Co., Cleveland, has increased its capital from $300,000 to $750,000.

A company is in process of organization at South Bend, Ind., which will be known as the South Bend Iron Bed Co. J. P. Lechner has been elected president. It is the present plan of the company to manufacture iron beds in South Bend.

Fires and Accidents:—

The plant of the White-Warner Co., Taunton, Mass., was damaged by fire to the extent of $50,000 Aug. 2. The fire broke out in the foundry.

The Ontario Tack Co.'s plant, Hamilton, Ont., was partially destroyed by fire July 31. The loss was about $40,000.

The foundry known as the Ark, one of the landmarks of Algona, Pa., was partially destroyed by fire recently. The plant will be rebuilt.

Fire on the morning of Aug. 6 in the machine shop of the Morgan Iron Works, East Tenth St., New York, did damage estimated at $25,000 to the building and its machinery.

On the night of Aug. 5 fire broke out in the four-story factory building at 406 to 412 East 104th St., New York, doing damage estimated at $60,000. Among those who suffered were Brady & Hauptmann, proprietors of the Mutual Iron Works, who occupied the ground floor; H. Derby, manufacturer of brass railings, of the Keystone Gas Fixture Works.

Fire destroyed the Bellaire Boiler & Bridge Works, Bellaire, O., July 31. Loss $10,000.

Fire on the night of Aug. 7 destroyed practically all of

the shops of the Enterprise Boiler Co., Youngstown O., causing a loss of $50,000, partially covered by insurance.

Fire at St. Clair, near Philadelphia, Pa., Aug. 4, destroyed the tool shop, blacksmith shop and other buildings of the St. Clair Coal Co., Scranton, Pa.

Fire damaged the foundry of the American Woodenware Machine Co. Green Bay, Wis., Aug. 5.

New Construction:—

The Osborn Engineering Co., Cleveland, has received bids for a large factory building for Warner & Swasey to be erected on East Prospect St., Cleveland, near the C. & P. railway. This building will be about 50 feet wide and 203 feet long.

It is announced that A. F. Bumgarten & Bros., of Pittsburg, who recently purchased the plant of the Huntington Tin & Planished Plate Co., at Huntington, W. Va., have already made provision for the equipment necessary to remodel the plant for the manufacture of small T-rails for tramroads and will put the plant in operation in a short time.

The Pittsburg Piping & Equipment Co., Pittsburg, has completed the erection of its building and has also installed the entire equipment which is proposed at this time. The plant is thoroughly equipped to take care of machine shop work in general and the pipe fitting business in particular, and in addition, machinery to take care of the bending of wrought iron pipe up to and including 30 inches in diameter. The company has been turning out material at its works for the past three weeks.

That part of the plant of the J. I. Case Threshing Machine Co., Racine Wis., recently destroyed by fire will be rebuilt immediately.

The Southern Foundry & Machine Co., Knoxville, Tenn., will rebuild its plant recently destroyed by fire as soon as the insurance is adjusted. During the few years of its existence the company has built up a large business in the South.

Work of grading for the new plant of the Pawling & Harnischfeger Co., Milwaukee, Wis., has been commenced. The main building will be 350x400 feet and the foundry will be 280x100 feet. The office will be three stories 60x100 feet. All of the buildings will be constructed of iron and brick, fireproof, and equipped with the most modern appliances for the manufacture of electric cranes.

The National Steel Foundry Co., New Haven, Conn., has given out the contract for its new foundry to the McClintic-Marshall Construction Co. The building is to be 165x411 feet, of steel construction, and with two wings each 35x100 feet.

The Pittsburg Safe Co. will build a plant at Connellsville, Pa. The Connellsville new directors are: J. C. McConnell, J. A. DeWitt and A. B. Sherrick.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has begun operating its new brass foundry. A large addition is being made to its iron foundry.

Work has been begun by M. A. Ryan, proprietor of the Northwestern Steam Boiler Works Co., Duluth, on the rebuilding of his plant which was destroyed by fire Feb. 28. The building will cost $20,000.

The Reeves Engine Co., Trenton, N. J., will build a foundry, one-story brick, 92x127 feet, equipped with all modern apparatus.

The West Allis Malleable Iron & Chain Belt Co., West Allis, Wis., is making important improvements. The foundry of the plant is to be made 208 feet longer, and the chain belt department will be enlarged. About 200 men will be employed.

Extensive improvements are being made at the plant of the Seaboard Steel Casting Co., Chester, Pa. The third furnace is nearly completed. It is larger than either of the two now in operation. The foundations have been put in for an extension to the main foundry building. The company employs about 375 men.

The new plant of the Keystone Drop Forge Works, Chester, Pa., is now in operation. Machinery from the old plant at Germantown Junction, Philadelphia, has been removed to the Chester works and shipments of finished material are being made daily.

The Illinois Steel Co. has purchased a tract of land comprising 22 lots, adjacent to its works at South Chicago, for an aggregate consideration of about $60,000, and will make improvements as recently announced.

The Dan Shea Boiler Works, Memphis, Tenn., will be enlarged by the erection of new buildings and the installation of additional machinery.

The Bon Air Coal & Iron Co., Bon Air, Tenn., has let the contract for 200 beehive coke ovens.

The Rumsey & Co., Seneca Falls, N. Y., will erect a brick addition, 120 feet by 45 feet, two stories. A larger and better class of pumps will be made in the new building, which will be a model of its kind fully equipped.

Langmaid & Morrill, Bath, Me., will build a machine shop and foundry.

The Vulcan Iron Works Co., Winnipeg, Manitoba, is erecting a foundry 100x198 feet, which promises to be the best equipped of its kind in Western Canada, when completed. It is expected that the new building will be ready for use by the end of September.

The Phœnix Construction Co., of Chicago, has under way an $85,000 contract for the building of a water works at Aurora, Ind. The specifications call for the erection of a 280,000 gallon reservoir of ferro concrete construction and about 800 tons of cast iron pipe, two boilers and six pumps.

The Beggs Pipe & Foundry Co., Birmingham, Ala., will erect a one-story brick building to be used as a foundry.

The new Zanesville & Western R. R. shops at Fultonham, O., have been completed. They include a roundhouse, machine shops, blacksmith shops, etc. A new 40-room hotel for the trainmen has also been erected.

The new foundry building and machine shop of the Nixon Mining Drill Co., Chattanooga, Tenn., which has been in the course of erection for several months, will be completed in two weeks.

The Simplex Railway Appliance Co., with offices at 227 Dearborn St., Chicago, will increase the size of its plant at Hammond, Ind. A new two-story plant 300x200 feet will be erected and 500 more employes will be employed.

W. H. H. Stevenson, Baltimore, Md., will erect a one-story brick machine shop 60x106½ feet, which will cost $10,000.

The work of constructing the large addition to the machine shop department of the Southern R. R.'s plant at Chattanooga, Tenn., has been begun. The new machine shop is to be 175x125.

The Pittsburg and Valley Districts:—

The new plant of the Rosedale Foundry Co., Allegheny, Pa., is now in partial operation. The new foundry is on in full, while the machine shop is not yet in full operation for the reason that much machinery is yet to be installed. The main building, containing the molding floor and machine shop, is 460x98 feet. It is commanded by one 25-ton crane, two of 20-tons capacity each and two of 5-tons capacity. All are electrically operated.

The American Shovel & Stamping Co., now operating a plant at Lorain, O., will probably locate in the Pittsburg district within the next six months. The citizens of Tarentum, Pa., have offered a big bonus to secure the plant.

The plant of the Heilman-James Metallic Packing Co. is to be removed from Pittsburg, Pa., to McKeesport, where a site has already been secured. The company is capitalized at $25,000.

The Wheeling Stove & Range Co., Wheeling, W. Va., is now looking for a new site for its plant. The present capacity of the foundry has been found to be entirely too small and the new plant to be erected will have double the capacity of the present. Several sites in the Wheeling district are under consideration.

No. 3 furnace of the Duquesne plant of the Carnegie Steel Co., Duquesne, Pa., has gone out of blast for relining.

The Pittsburg Meter Co., East Pittsburg, Pa., is erecting a large addition to its plant. The new building will

be 60x220 feet and three stories high. The company manufactures water and gas meters, proportional gas meters and gas pressure regulators.

The plant of the Westinghouse Air Brake Co., Wilmerding, Pa., resumed operations last week after a shut down of ten days for repairs.

The Shinn Slag Sand Co., of Pittsburg, has been incorporated for the purpose of manufacturing cement from blast furnace slag. It is probable that the plant will be built at New Castle, Pa., where several sites are already under consideration. A similar plant is in operation at Youngstown, O. The company will operate under a process patented by Joseph A. Shinn.

General Industrial Notes:—

F. H. Bultman & Co., general machinists, Cleveland, have moved into a more spacious quarters at 35 West Center street, and 131 Viaduct.

The Columbus Iron & Steel Colliery Company is preparing to open its coal property at Marting, W. Va., and will soon install a large set of coke ovens. This property is owned by the Columbus Iron & Steel Company.

The commercial interests of Ashland, Ky., have started a movement to secure the resumption of the sheet mill there, which has been idle for several months. The propositions and counter-propositions are being given much space in the local papers and it is expected that the agitation will result in some agreement. The company is willing to pay scale wages and allow the men a check clerk to look after the weighing, provided he is paid by them. A claim of short weights, which the company denies, was one of the causes of the strike. The company also declines to reinstate four men who were objectionable and sought to run the business for the company.

The Ball Engine Co., Erie, Pa., reports the shipment of engines for electric service during July to the following companies: Longmont Beet Sugar Co., Longmont, Colo.; Lookout Mountain Iron Co., Battelle, Ala.; Hamilton Hotel, Louisville, Ky.; Vermont Hospital for Insane, Waterbury, Vt.; Polyclinic Hospital, Philadelphia, Pa.; Tawas Sugar Co., East Tawas, Mich.; Alvey & Ferguson Co., Louisville, Ky.; Owosso Sugar Co., Owosso, Mich.; Imperial Tobacco Co., Rocky Mount, N. C.; Imperial Tobacco Co., Wilson, N. C.; Pittsburg Coal Co., Allison Mine; Federal Chemical Co., Nashville, Tenn.; Washington Electric Light & Pr. Co., Washington, Pa.; Jefferson Coal Co., Piney Fork, O.; California Fig Syrup Co., Louisville, Ky.; Cooper, Wells & Co., St. Joseph, Mo.; Manhattan Ry. Co., New York City; Menominee River Sugar Co., Menominee, Mich.; Windsor Sugar Co., Windsor, Colo.; Fort Collins Sugar Co., Ft. Collins, Colo.; Stewart & Co. store, Baltimore, Md.; First Nat'l Bank Bldg., Chicago.

Work of rebuilding the Trussville Alabama furnace of the Lacey-Buek Co. is progressing steadily and the new stack will be blown in in September. The furnace will then have a capacity of 200 tons a day.

President Felton, of the Chicago & Alton Railway Co., has submitted to the city council of Bloomington, Ill., a communication on the subject of the expansion of the railroad shops for their removal to another city. He states that a fair value of the entire property sought to be acquired by the company to enlarge its shops is $112,500, and that the total cost of its purchase at prices fixed by its owners would be $350,000. At the latter figures it is impossible for the company to consider its purchase. For a less cost it could buy land and erect new buildings elsewhere. He asked the city to vacate two streets for the use of the company.

The 100-ton floating crane at the Brooklyn navy yard constructed by the Brown Hoisting Machinery Co., of Cleveland, has been tested successfully. The construction of this crane was begun in 1899. The contract price was $100,000.

The Ingersoll-Sergeant Drill Co., which has placed a line of pneumatic tools on the market, reports immediate recognition of the superiority of the Haeseler "Axial Valve" hammers, upon tests being made. Among the latest purchasers of these tools are: Niles-Bement-Pond Co., Ramapo Iron Works, McPherson Switch & Frog Co., Creswell & Waters Co., Warren Foundry & Machine Works, Chicago, Rock Island & Pacific R. R., Brown Hoisting & Conveying Machine Co., Howard Iron Works, International Boiler Works Co.

The machinery of the Jenison Iron & Steel Works is being removed from the burned plant at Jenison, and the works will be established at Grand Rapids, Mich., as soon as a suitable building can be obtained. The machinery was not very badly damaged by the fire, and it is expected that the plant will soon be running again.

The Smith's Falls Malleable Castings Co., Ltd., Smith's Falls, Ont., capital $150,000, recently incorporated, will take over the business of the Smith's Falls Malleable Iron Works, Smith's Falls, Ont. The office of the company is not at Toronto, as previously reported.

The Solomon Machine Co., successors to the Charles S. Solomon Co., Philadelphia, will conduct a general machine business. The company does not intend to build.

Two more additions to their already extensive plant, another new kiln, and recent installation of new machinery, etc., for making its pressed emery wheels, is the report that comes from the Abrasive Material Co., of Philadelphia. The present Abrasive Emery Wheel is well known, but the makers realize the need of special wheels for special purposes and have decided to place on the market a pressed wheel that will, for its special work, equal those made by the vitrified process.

The Fort Scott Mfg. Co., Fort Scott, Kan., recently organized with a capital of $50,000, to engage in foundry and machine work, has taken over the Kite foundry. The following are the officers: C. C. Crain, president; J. H. Mead, vice president; J. H. Prichard, secretary; L. H. Stout, treasurer, and M. T. Kite, superintendent. It is the purpose of the company to double the capacity of the plant. It will manufacture the Kite gasoline engine, the Fort Scott feed mill, and do a general foundry and machine shop business.

The Alma Mfg. Co., Alma, Mich., has closed a contract with L. E. Williams, of Omaha, Neb., for the manufacture of a new style gasoline engine, known as the McVicor automatic gasoline engine. It is expected that a new company, to have charge of the sales, will be organized.

It is announced at Denver that plans for the absorption of the Utah Fuel Co. and auxiliary companies by the Colorado Fuel & Iron Co. are practically completed. It is expected that the consolidation will not take place until after the meeting, on the 19th of this month, of the Colorado Fuel & Iron Co. George Gould is the principal stockholder of Utah Fuel Co., which owns valuable coal and iron mines.

W. F. McCrea, Beaver Falls, Pa., has decided to move his foundry and machine shop from Beaver Falls to Sharon. It will be enlarged and stoves will be manufacturned.

The Dow Wire Works, Louisville, Ky., has leased for 10 years property at Franklin and Buchanan Sts., and as soon as the plant can be fitted up, the company will move into its new quarters. The new building is much larger than the old one, and the company will largely increase its output.

The Harrisburg Pipe & Bending Works, Harrisburg, Pa., has begun the manufacture of seamless steel cylinders, used for holding carbonic acid gas.

It is reported that an association of gas-engine manufacturers has recently been formed in Germany, and that the office is at Nürnberg. Sixteen works are said to belong to the union, among which are the Körting works of Hanover and the Börsig works of Berlin.

The Republic Iron & Steel Co. announces that it has not permanently shut down its eagle mill at Ironton, but that it was temporarily closed, owing to a shortage of orders, and will be started just as soon as business justifies.